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CONTAMINATION ASSESSMENT REPORT FLYING CLUB SITE BUILDING A-127 BOCA CHICA FIELD NAS KEY WEST FL

4/1/1994

ABB ENVIRONMENTAL SERVICES INC

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CONTAMINATION ASSESSMENT REPORT

FLYING CLUB SITE, BUILDING A-127
NAVAL AIR STATION KEY WEST
BOCA CHICA FIELD, KEY WEST, FLORIDA

CONTRACT TASK ORDER NO. 098
CLEAN - DISTRICT I
CONTRACT NO. N62467-89-D-0317

APRIL 1994

SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
NORTH CHARLESTON, SOUTH CAROLINA
29419-9010

ABB
ASEA BROWN BOVERI

April 8, 1994

Southern Division
Naval Facilities Engineering Command
ATTN: Mr. Gabriel Magwood, Code 1849
2155 Eagle Drive
North Charleston, South Carolina 29418

SUBJECT: Contamination Assessment Report; Transmittal
Flying Club Site, Building A-127
Naval Air Station (NAS), Key West, Florida
Contract No. N62467-89-D-0317, CTO No. 098.

Dear Gabriel:

Enclosed for your review are seven copies of the Contamination Assessment Report (CAR) for the Flying Club site (Building A-127) at NAS Key West, Florida. These include two copies for the Florida Department of Environmental Protection (FDEP) and two copies for Bill Hunt at NAS Key West. Your comments have been incorporated into the document.

The six-month holding time for groundwater laboratory analyses will expire April 18, 1994. Copies must be forwarded to FDEP before this date. We understand that you will forward the distribution copies. Should you have any questions, or if additional information is required, please contact me at your earliest convenience.

Very truly yours,

ABB ENVIRONMENTAL SERVICES, INC.

Roger Durham
Senior Geologist

Enclosures

cc: File
Mark Diblin

08508-001

ABB Environmental Services Inc.

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Berkeley Building
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ASEA BROWN BOVERI

February 2, 1993

Southern Division
Naval Facilities Engineering Command
ATTN: Mr. Gabriel Magwood, Code 1849
2155 Eagle Drive
North Charleston, South Carolina 29418

SUBJECT: Contamination Assessment Report; Transmittal
Flying Club Site, Building A-127
Naval Air Station (NAS), Key West, Florida
Contract No. N62467-89-D-0317, CTO No. 098.

Dear Gabriel:

Enclosed for your review are two copies of the Contamination Assessment Report (CAR) for the Flying Club site (Building A-127) at NAS Key West, Florida. Two copies each will be forwarded to Bill Hunt at NAS Key West and the Florida Department of Environmental Protection upon your approval.

Should you have any questions, or if additional information is required, please contact me at your earliest convenience.

Very truly yours,

ABB ENVIRONMENTAL SERVICES, INC.

John V. Pittman
Task Order Manager

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CONTAMINATION ASSESSMENT REPORT

FLYING CLUB SITE, BUILDING A-127
NAVAL AIR STATION KEY WEST
BOCA CHICA FIELD, KEY WEST, FLORIDA

Contract Task Order No. 098

Contract No. N62467-89-D-0317

Prepared by:

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Gabriel Magwood, Code 1849, Engineer-in-Charge

April 1994

FOREWORD

Subtitle I of the Hazardous and Solid Waste Amendments (HSWA) of 1984 to the Solid Waste Disposal Act (SWDA) of 1965 established a national regulatory program for managing underground storage tanks (USTs) containing hazardous materials, especially petroleum products. Hazardous wastes stored in USTs were already regulated under the Resource Conservation and Recovery Act (RCRA) of 1976, which was also an amendment to SWDA. Subtitle I requires that the U.S. Environmental Protection Agency (USEPA) promulgate UST regulations. The program was designed to be administered by the individual States, who were allowed to develop more stringent standards, but not less stringent standards. Local governments were permitted to establish regulatory programs and standards that are more stringent, but not less stringent than either State or Federal regulations. The USEPA UST regulations are found in the Code of Federal Regulations, Title 40, Part 280 (40 CFR 280) (*Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks*) and Title 40 CFR 281 (*Approval of State Underground Storage Tank Programs*). Title 40 CFR 280 was revised and published on September 23, 1988, and became effective December 22, 1988.

The Navy's UST program policy is to comply with all Federal, State, and local regulations pertaining to USTs. This report was prepared to satisfy the requirements of the Florida Department of Environmental Protection (formerly the Florida Department of Environmental Regulation) Chapter 17-770, Florida Administrative Code (FAC) (*State Underground Petroleum Environmental Response*) regulations on petroleum contamination in Florida's environment as a result of spills or leaking tanks or piping.

Questions regarding this report should be addressed to the Commanding Officer, Naval Air Station Key West, Boca Chica Field, Key West, Florida, or to Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM), Gabriel Magwood, Code 1849, at AUTOVON 563-0658 or (803) 743-0658.

EXECUTIVE SUMMARY

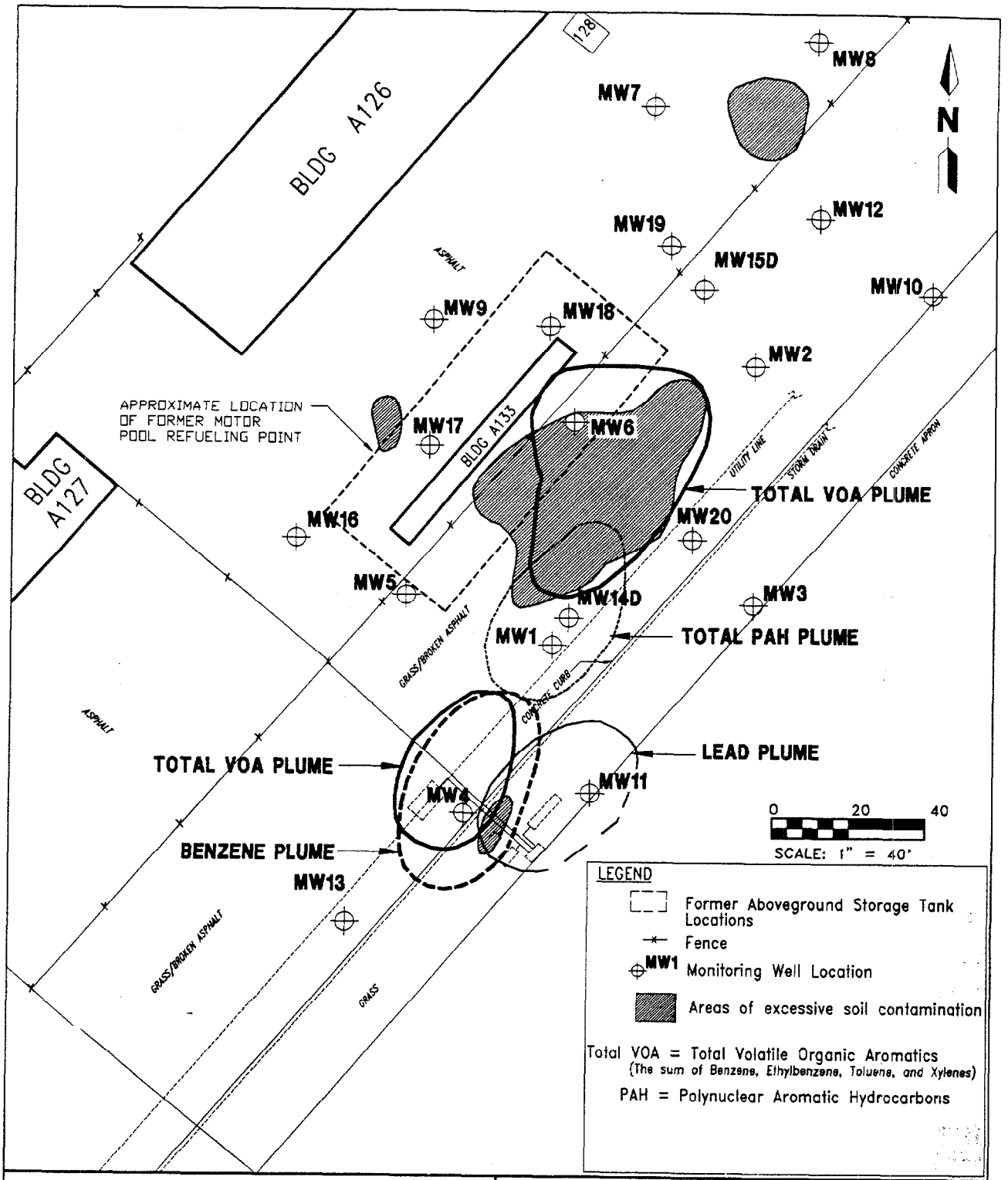
The Boca Chica Flying Club is the former location of four aboveground storage tanks (ASTs) and associated dispensers and piping, which contained aviation gasoline (AVGAS). The ASTs, fuel dispensers, and associated piping were removed from the site in February 1992.Three ASTs had capacities of 560 gallons; the fourth AST had a capacity of 1,000 gallons. According to facility personnel, the Flying Club was in operation from the until the late 1960's. The suspected cause of petroleum contamination at the site was overfilling of the ASTs. Building A-133, located approximately 70 feet north of the former ASTs (see Executive Summary Figure), is a remnant of a former motor pool refueling point and was identified as another possible source of contamination at the site. Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM) contracted ABB Environmental Services, Inc. (ABB-ES), to perform a contamination assessment (CA) at the site and to prepare a contamination assessment report (CAR). ABB-ES conducted the CA from October to December 1993.

Seventy-one soil borings and 20 monitoring wells were placed at the site to assess the degree and extent of soil and groundwater contamination. Soil samples were collected and analyzed for volatile organic compounds (VOCs) by organic vapor analyzer (OVA) headspace analysis. Groundwater samples were collected from each monitoring well at the site and analyzed for kerosene analytical group constituents as defined in Chapter 17-770, Florida Administrative Code (FAC). Groundwater levels in monitoring wells were recorded to assess the groundwater flow direction, which is to the northeast.

OVA headspace analysis of soil samples indicated four areas of excessively contaminated soil (see Executive Summary Figure). Soil with VOC concentrations greater than 50 parts per million (ppm) is defined as being excessively contaminated (Chapter 17-770, FAC). The largest area of excessive soil contamination is located southeast of Building A-133. This area is approximately 70 feet long and 40 feet wide. Three smaller isolated areas were also identified: (1) the former AVGAS ASTs location, (2) the northwest side of Building A-133, near the former motor pool refueling point, and (3) the northern part of the site near MW-12. Excessive soil contamination appears to be restricted to 1 to 2 feet above the top of the water table (2 to 4 feet below land surface).

Compounds identified in monitoring well groundwater samples include benzene, ethylbenzene, toluene, xylenes, methyl tert-butyl ether (MTBE), total recoverable petroleum hydrocarbons (TRPH), lead, polynuclear aromatic hydrocarbons (PAH), and several chlorinated compounds. Groundwater contaminant concentrations were compared to Class G-III groundwater target levels in Chapter 17-770, FAC, where applicable.

Benzene, total volatile organic aromatics (VOA), and lead concentrations in groundwater exceed State target levels for Class G-III groundwater (total VOA is the sum of benzene, ethylbenzene, toluene, and xylenes). The areal extent of the benzene contamination, exceeding the Chapter 17-770, FAC target level, appears to be restricted to the vicinity of monitoring well MW-4, located at the former location of the ASTs (see Executive Summary Figure). Two total VOA contamination plumes were identified: one in the vicinity of the former ASTs, and a second in the vicinity of the former motor pool fuel refueling point, located east of



EXECUTIVE SUMMARY

CONTAMINATION ASSESSMENT REPORT
FLYING CLUB SITE, BUILDING A-127

NAS KEY WEST
KEY WEST, FLORIDA

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Building A-133. Lead concentrations in groundwater exceeded the State target level only in the vicinity of monitoring well MW-11, located east of the former ASTs. PAH (including naphthalenes) concentrations in groundwater exceed applied groundwater guidance concentrations in the vicinity of monitoring well MW-1, located downgradient of the former ASTs. Chlorinated compounds concentrations detected in groundwater were generally below groundwater guidance concentrations and do not appear to be a concern at the site.

Based on the findings, conclusions, and interpretations of the CA, ABB-ES recommends that a remedial action plan (RAP) be prepared to address excessively contamination soil and benzene, total VOA, and lead in groundwater. The PAH (and naphthalenes) contamination in the vicinity of monitoring well MW-1 should also be addressed. The manner of soil and groundwater remediation will be presented in the RAP, which will be developed pending Florida Department of Environmental Protection (FDEP) approval of this CAR.

ACKNOWLEDGMENTS

In preparing this report, the Underground Storage Tank Section of the Comprehensive Long-Term Environmental Action, (CLEAN) Group at ABB Environmental Services, Inc. (ABB-ES), commends the support, assistance, and cooperation provided by the personnel at Boca Chica Field, Naval Air Station, Key West, Florida, and Southern Division, Naval Facilities Engineering Command.

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Naval Air Station Key West
Boca Chica Field, Key West, Florida

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- Appendix B: Lithologic Logs
- Appendix C: Tidal Influence Study
- Appendix D: Aquifer Parameter Calculations
- Appendix E: Groundwater Sample Analytical Data

GLOSSARY

ABB-ES	ABB Environmental Services, Inc.
AST	aboveground storage tank
AVGAS	aviation gasoline
bls	below land surface
CA	contamination assessment
CAP	Contamination Assessment Plan
CAR	Contamination Assessment Report
CFR	Code of Federal Regulations
CLEAN	Comprehensive Long-Term Environmental Action, Navy
CNO	Chief of Naval Operations
CompQAP	Comprehensive Quality Assurance Plan
CTO	Contract Task Order
1,1-DCA	1,1-dichloroethane
1,2-DCB	1,2-dichlorobenzene
1,1-DCE	1,1-dichloroethene
1,2-DCE	1,2-dichloroethene
EDB	ethylene dibromide
FAC	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
FDER	Florida Department of Environmental Regulation
FID	flame ionization detector
ft/day	feet per day
ft/ft	feet per foot
ft/min	feet per minute
HSWA	Hazardous and Solid Waste Amendments of 1984
ID	inside diameter
K	hydraulic conductivity
MLLW	mean lower low water
MTBE	methyl tert-butyl ether
mg/ℓ	milligrams per liter
msl	mean sea level
NAS	Naval Air Station
OVA	organic vapor analyzer
PAH	polynuclear aromatic hydrocarbons
PCB	polychlorinated biphenyl
POA	Plan of Action
ppb	parts per billion

ppm	parts per million
PVC	polyvinyl chloride
QA/QC	quality assurance/quality control
RAP	Remedial Action Plan
RCRA	Resource Conservation and Recovery Act
SOUTHNAV-FACENGCOM	Southern Division, Naval Facilities Engineering Command
SWDA	Solid Waste Disposal Act of 1965
TCE	trichloroethene
TOC	top of casing
TRPH	total recoverable petroleum hydrocarbons
USEPA	U.S. Environmental Protection Agency
UST	underground storage tank
V	average pore water velocity
VOA	volatile organic aromatics

1.0 INTRODUCTION

ABB Environmental Services, Inc. (ABB-ES), was contracted by the Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM) to perform a contamination assessment (CA) and submit a Contamination Assessment Report (CAR) for the former location of the Flying Club at Boca Chica Field, Naval Air Station (NAS), Key West, Florida. The scope of services is described in Contract Task Order (CTO) No. 098, the Plan of Action (POA), and the Contamination Assessment Plan (CAP) and includes the following:

- collecting soil samples in the unsaturated zone for organic vapor analyzer (OVA) headspace analysis to assess the concentration of volatile organic compounds (VOCs) in soil,
- installing and sampling groundwater monitoring wells to assess the horizontal and vertical extent of groundwater contamination,
- collecting water level data to assess the groundwater flow direction and hydraulic gradient at the site,
- conducting a potable well inventory within a 0.25-mile radius of the site,
- conducting slug tests on selected wells to estimate aquifer characteristics,
- conducting a tidal influence study to assess the effect of tides on groundwater flow direction, and
- reducing and analyzing pertinent data gathered during the CA to complete this CAR.

The CA field investigation was conducted from October to December 1993. The following sections of this CAR present the background information, data compilation, field investigative results, and recommendations for further action at the site.

2.0 SITE BACKGROUND

NAS Key West is located approximately 150 miles southwest of Miami, Florida, in Monroe County, Florida (Figure 2-1). NAS Key West, a complex of activities located in numerous areas of the Lower Florida Keys, encompasses approximately 5,000 acres. The majority of these activities are concentrated on Boca Chica Key and Key West. The mission of NAS Key West is to maintain and operate facilities and provide services and materials to support operations of aviation activities and units designated by the Chief of Naval Operations (CNO).

The Flying Club is located along the northwest boundary of Taxiway "H" approximately 50 to 100 feet south of Building A-133 at Boca Chica Field (Figure 2-1). The Flying Club is currently inactive and was used as an aircraft parking and refueling area. The site is the former location of four aboveground storage tanks (ASTs) and associated dispensers and piping, which reportedly contained aviation gasoline (AVGAS) (Figure 2-2). Three ASTs reportedly had capacities of 560 gallons. The fourth AST reportedly had a capacity of 1,000 gallons. According to facility personnel, The Boca Chica Flying Club was in operation until the late 1960's. The ASTs, fuel dispensers, and associated piping were removed from the site in February 1992. Overfilling of the ASTs is the suspected cause of petroleum contamination at the site.

The area in the immediate vicinity of the ASTs is covered by broken asphalt, grass, and limestone. The site is bordered along the southeast by a concrete apron that is part of Taxiway "H", which is used for airplane and helicopter parking. During the site investigation, routine engine testing and refueling operations were observed to occur. A northeast-southwest trending, 6-inch high concrete curb is located approximately 20 feet northwest of Taxiway "H". An underground storm drain parallels the concrete curb over much of the site area. An underground utility line also runs parallel to the concrete curb on the northwest side of the curb. The northwest boundary of the site is bordered by an 8-foot high, chain-link fence.

There are three structures located on the northern side of the fence, Buildings A-126, A-127, and A-133. Building A-126, located approximately 150 feet northerly of the former ASTs, was formerly used as a transportation facility and is currently used as an electrical maintenance and repair facility. Building A-127, located approximately 120 feet northwest of the former ASTs, is currently inactive and was formerly used as a transportation facility. Building A-133, located approximately 70 feet north of the former ASTs, is a remnant of a former motor pool refueling point and is currently used to store transformers, some of which contain polychlorinated biphenyls (PCBs). Discussions with activity personnel indicated that underground storage tank(s) (USTs) associated with the motor pool refueling operations had been removed. Labels on the transformers indicated that they contained less than 50 parts per million (ppm) of PCBs. Interviews with NAS Key West personnel indicate that the area in the vicinity of Building A-133 may also have been used as an auto hobby shop and staging area.

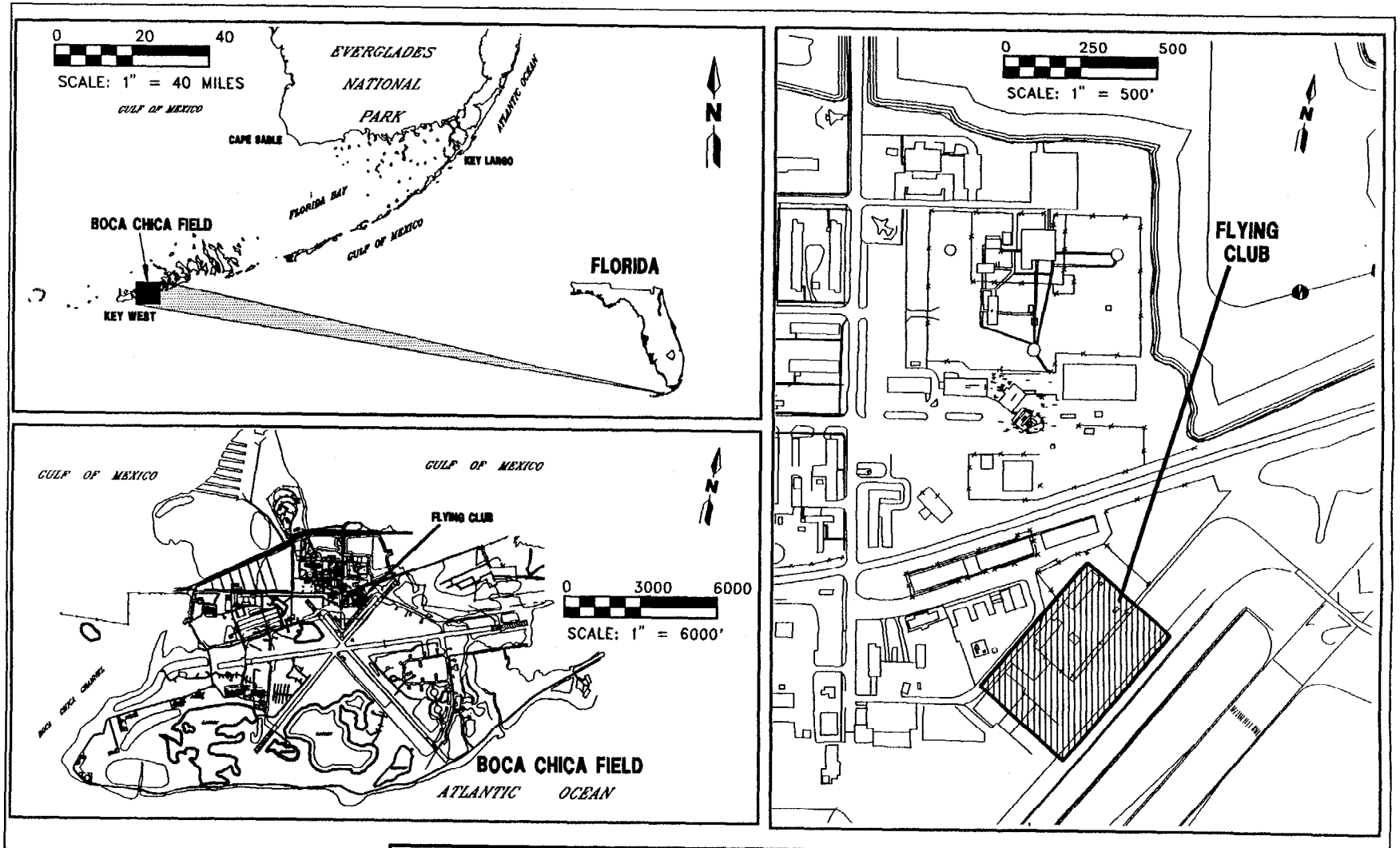

FIGURE 2-1
SITE LOCATION MAP

CONTAMINATION ASSESSMENT REPORT
FLYING CLUB SITE, BUILDING A-127

NAS KEY WEST
KEY WEST, FLORIDA

A-322/KGP/06/24/93

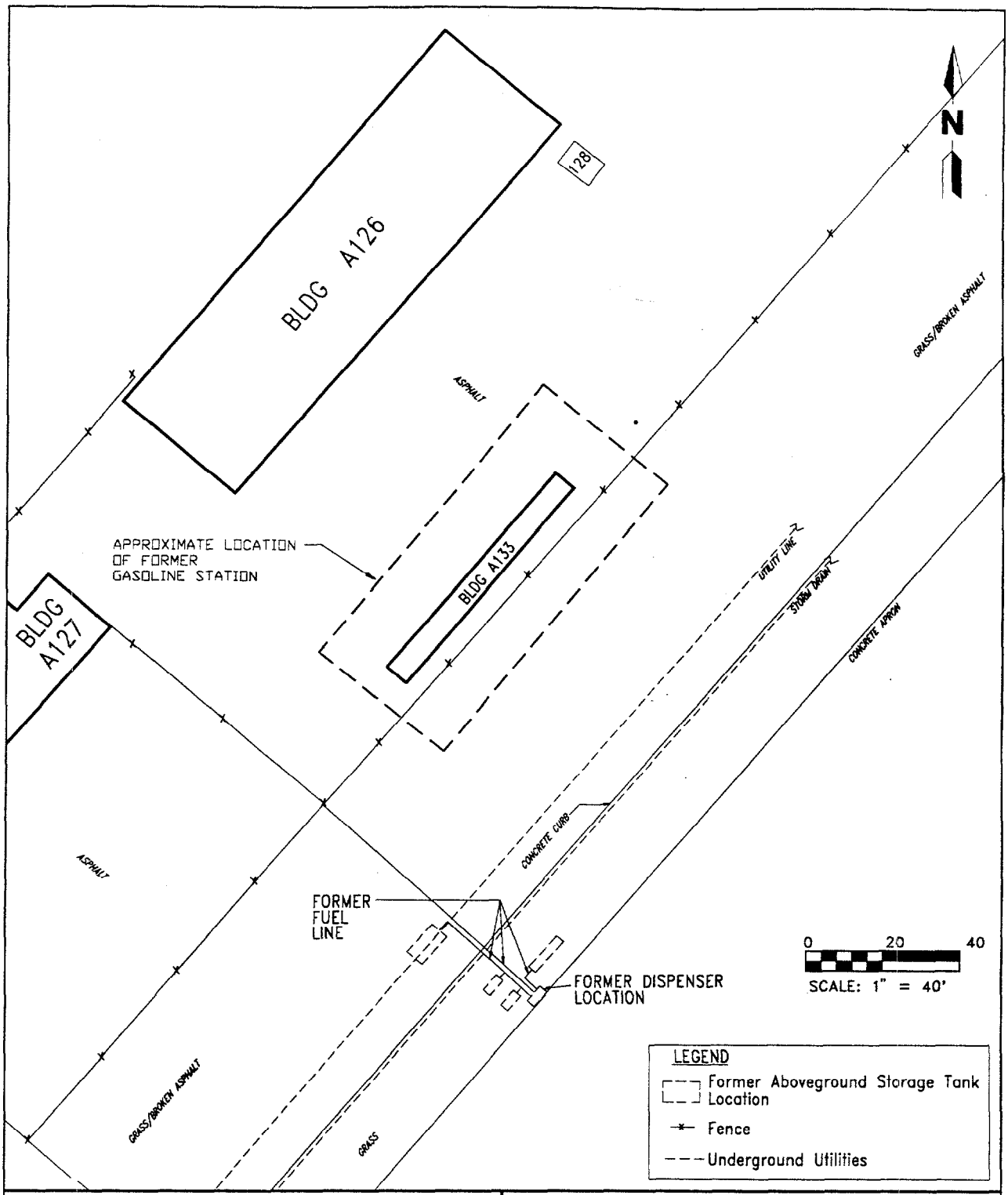

FIGURE 2-2
SITE PLAN

FLYCLUB/MAH/12/13/93

CONTAMINATION ASSESSMENT REPORT
FLYING CLUB SITE, BUILDING A-127

NAS KEY WEST
KEY WEST, FLORIDA

3.0 SITE CONDITIONS

3.1 PHYSIOGRAPHY. Regional physiography is discussed in Appendix A, Site Conditions. The surface topography at the site is flat, with ground elevations of approximately 5 feet above mean sea level (msl) (U.S. Geological Survey, 1971).

3.2 HYDROGEOLOGY.

3.2.1 Regional Regional hydrogeology is discussed in Appendix A.

3.2.2 Site Specific Site-specific hydrogeologic characteristics were obtained from information gathered during the site investigation. The unconfined surficial aquifer is the principal aquifer of concern in the Key West area. Rainwater infiltration appears to be the only source of freshwater recharge to the aquifer. Specific conductance of the groundwater can vary greatly depending on whether it is the "wet" season or a drought. Water quality data indicate that the surficial aquifer in the Key West area is an unlikely source of potable water (McKenzie, 1990) thus, the surficial aquifer will be treated herein as a G-III groundwater source. Potable water at NAS Key West is obtained from mainland Florida through the Florida Keys Aqueduct.

The surficial aquifer was penetrated to a depth of 32 feet below land surface (bls) during this investigation. This zone is generally composed of a mixture of oolitic sand; light gray, non-plastic clay; and limestone gravel. Some pebble-sized limestone fragments were encountered. The sand is light brown to white, and varies from fine grained to coarse grained. Clay content in the soil ranges from 0 to 30 percent, and typically averages 20 percent. The amount of gravel in the samples is typically 10 percent to 20 percent, and generally increases with depth. Because the soil borings are very shallow (less than 6 feet bls) and the lithology across the site varies very little, only the lithologic logs for borings in which monitoring wells were installed are presented in Appendix B, Lithologic Logs.

During this investigation, groundwater was encountered at depths ranging from approximately 2.5 to 4 feet bls. Groundwater flow direction in the surficial aquifer is to the northeast. A tidal influence study indicates groundwater elevations and gradients are tidally affected (see Appendix C, Tidal Influence Study); however, the direction of groundwater flow appears to be consistently to the northeast at all times during the tidal cycle.

4.0 METHODOLOGIES AND EQUIPMENT

The site investigation was conducted from October to December 1993. All methodologies and equipment used during the field investigation were in conformance with the ABB-ES, Florida Department of Environmental Protection (FDEP)-approved, Comprehensive Quality Assurance Program Plan (CompQAPP).

4.1 SOIL BORING ADVANCEMENT, SOIL SAMPLING, AND ORGANIC VAPOR ANALYZER (OVA) HEADSPACE ANALYSIS. Seventy-one soil borings (designated SB-1 through SB-71) were advanced into the water table to assess the horizontal and vertical extent of petroleum contamination in the vadose zone, to characterize the type of subsurface material, and to aid in the placement of groundwater monitoring wells. Soil boring locations are shown on Figure 4-1.

Soil borings were advanced using a truck-mounted drill rig with rotary drilling and solid-stemmed augers. Soil samples were collected at 2-foot vertical intervals until the water table was encountered. Total depth of soil borings varied from 4 feet bls to 6 feet bls, depending on the depth to the water table.

Soil samples were placed in 16-ounce glass jars and were sealed with a double layer of aluminum foil. Soil petroleum contamination was assessed by OVA headspace analysis following procedures outlined by Florida Department of Environmental Regulation (FDER) (1992). Samples were analyzed with an OVA equipped with a flame ionization detector (FID).

For each boring, OVA headspace readings of soil samples collected from 0 to 2 feet bls or from 2 to 4 feet bls, were used for soil assessment. Because samples collected from 4 to 6 feet bls were below the water table, OVA headspace readings for these samples were not used for soil assessment. The results of the soil boring and soil sampling program are discussed in Section 5.2.1.

4.2 MONITORING WELL INSTALLATION AND CONSTRUCTION. Borings for monitoring wells were advanced with a truck-mounted drill rig using rotary drilling techniques with 4.25-inch inside diameter (ID), hollow-stemmed augers. Eighteen shallow monitoring wells (designated KYW-A127-MW-1 through KYW-A127-MW13, and KYW-A127-MW-16 through KYW-A127-MW-20) were installed to depths of 12 to 13 feet bls. Two vertical extent wells (designated KYW-A127-MW-14D and KYW-A127-MW-15D) were installed at depths of 25 to 30 feet bls and 20 to 25 feet bls, respectively. Monitoring well locations are shown in Figure 4-2. For convenience, the prefix "KYW-A127" is not used in tables, figures, and text throughout this report.

Shallow wells were constructed of 2-inch ID, schedule 40, polyvinyl chloride (PVC) casing with flush-threaded joints and 10 feet of 0.010-inch machine-slotted screen. PVC well casing extends from the top of the screen to land surface. A 20/30 grade silica sand filter pack was placed in the annular space to approximately 1 foot above the top of the screened interval. A 6- to 12-inch thick bentonite seal was placed on top of the filter pack. The remaining annular space was grouted to surface with a neat cement grout. A protective traffic-bearing vault was installed to complete the well. Monitoring wells are equipped with a locking well cap and a padlock. Shallow monitoring well installation details are presented in Figure 4-3.

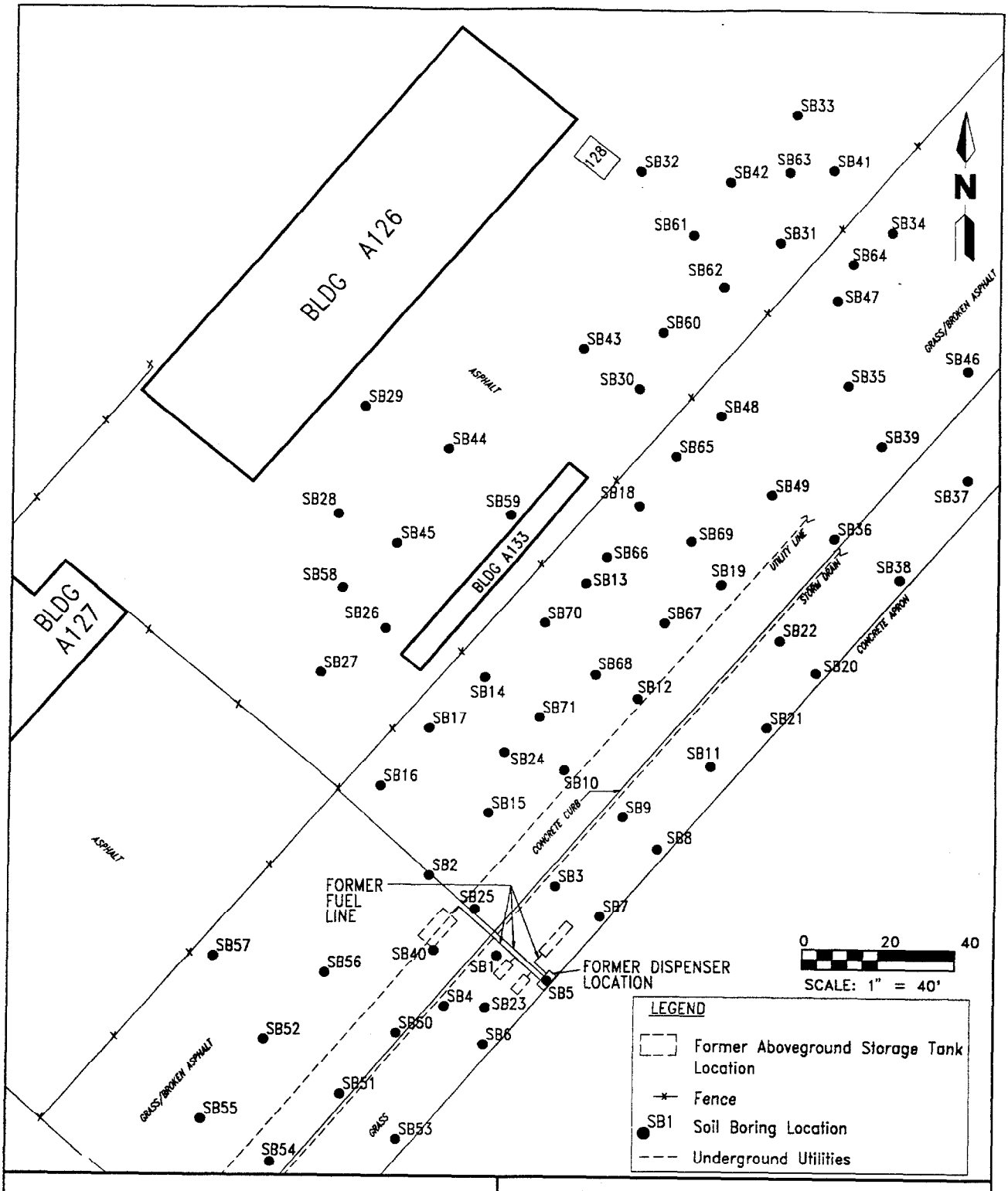

FIGURE 4-1
SOIL BORING LOCATION MAP

FLYCLUB/MAH/12/13/93

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FLYING CLUB SITE, BUILDING A-127

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KEY WEST, FLORIDA

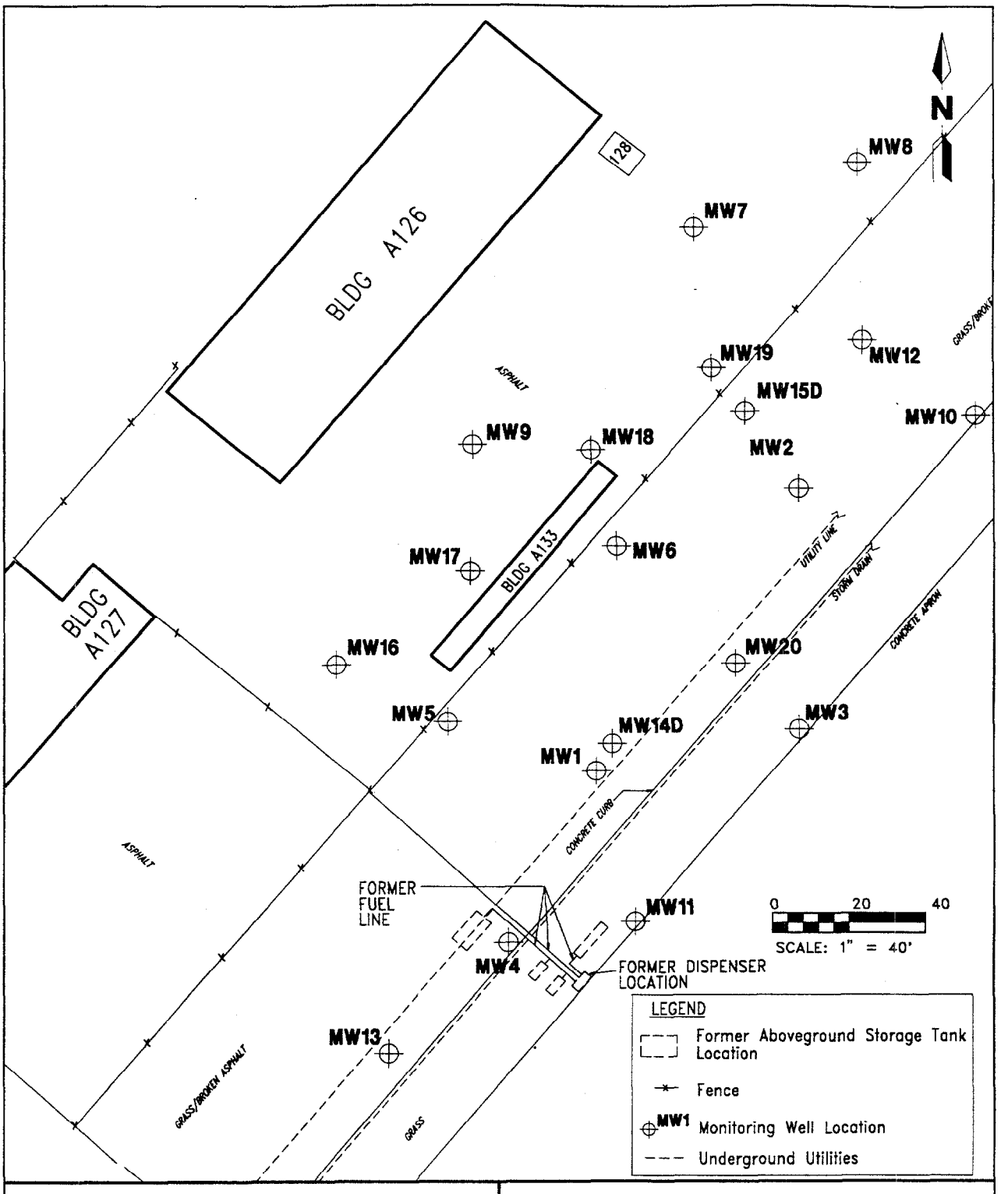

FIGURE 4-2
MONITORING WELL LOCATION MAP

FLYCLUB/MAH/12/13/93

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FLYING CLUB SITE, BUILDING A-127

NAS KEY WEST
KEY WEST, FLORIDA

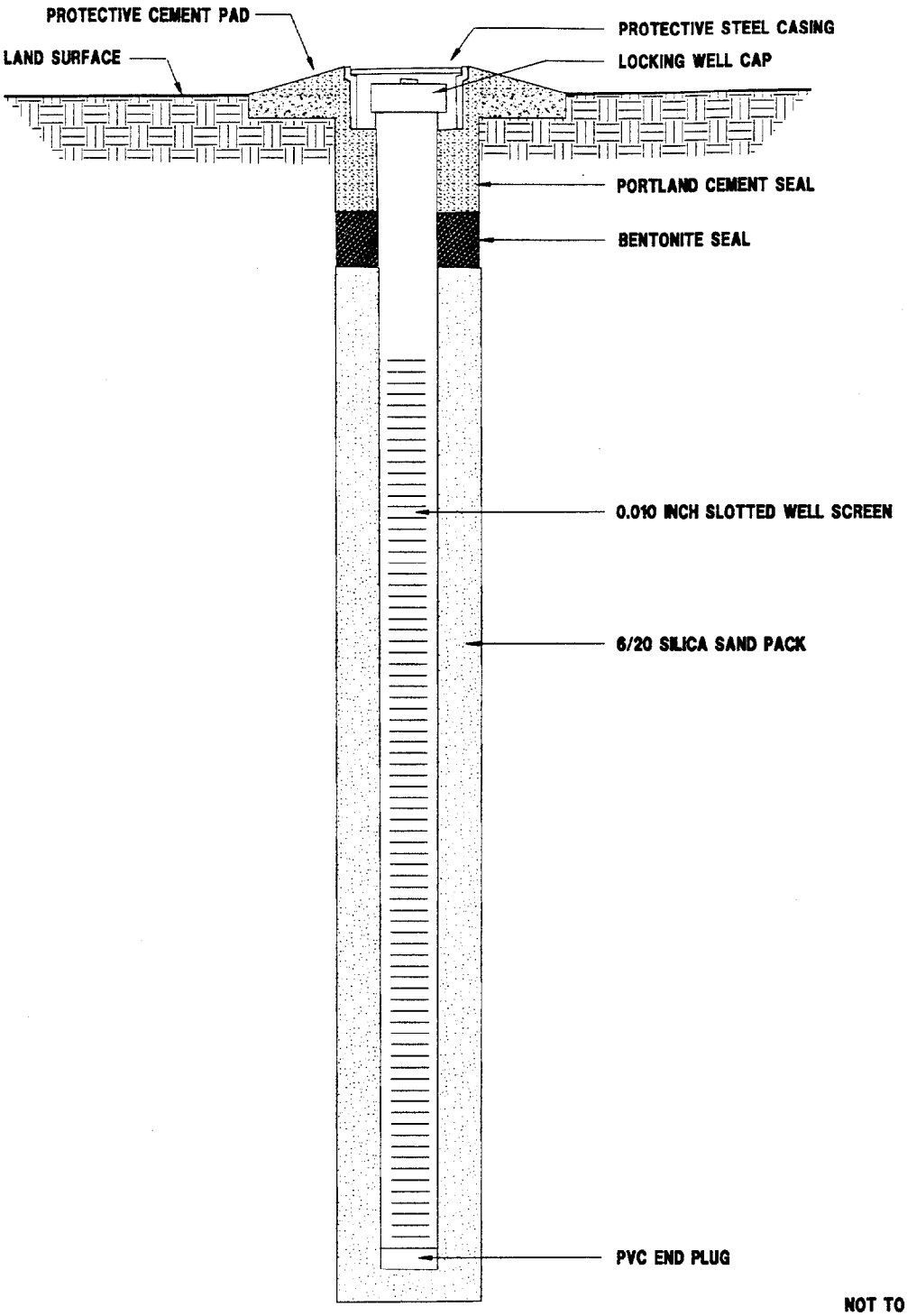

FIGURE 4-3
TYPICAL MONITORING WELL INSTALLATION DETAIL

KEYWELL/MP/1-7-93

CONTAMINATION ASSESSMENT REPORT
FLYING CLUB SITE, BUILDING A-127

NAS KEY WEST
KEY WEST, FLORIDA

Construction details for the vertical extent wells are identical to those of the shallow monitoring wells, except that 5 feet of well screen were used, and the 20/30 grade sand filter pack extended to 2 feet above the screened interval.

4.3 WATER TABLE ELEVATION MEASUREMENTS. Water table elevations were recorded from each monitoring well on October 18, 1993, and December 4, 1993. Depth to groundwater was measured to the nearest 0.01-foot using an electronic water level indicator. Water table elevations were calculated by subtracting the measured depth to groundwater from the top of casing elevation for each respective well. Top of casing elevations were referenced to a datum point arbitrarily set at an elevation of 10.00 feet above msl at MW-11. Water table elevation contour maps for each date were prepared using this information and are discussed in Section 5.3 of this report.

4.4 GROUNDWATER SAMPLING AND ANALYSES. Groundwater samples were collected from each monitoring well on October 19, 1993. Before sample collection, monitoring wells were purged with a Teflon™ bailer until five well volumes had been removed from the well. Groundwater samples were then collected using the bailer. Groundwater samples were placed into appropriate containers, properly preserved, and placed on ice. Groundwater samples were sent to Wadsworth/ALERT Laboratories, Tampa, Florida, under chain-of-custody procedures. Appropriate quality assurance/quality control (QA/QC) samples were collected and analyzed.

Because of the long history of AVGAS and gasoline storage at the site and the likelihood that gasoline constituents have weathered (degraded) to kerosene-type constituents, and also because of the presence of jet fuel refueling operations on the runway east of the site, samples were analyzed for constituents of the kerosene analytical group as defined in Chapter 17-770, Florida Administrative Code (FAC). Analyses were performed for volatile organic halocarbons by U.S. Environmental Protection Agency (USEPA) Method 601, for volatile organic aromatics (VOA) and methyl tert-butyl ether (MTBE) by USEPA Method 602, for polynuclear aromatic hydrocarbons (PAH) by USEPA Method 610, for total recoverable petroleum hydrocarbons (TRPH) by USEPA Method 418.1, for ethylene dibromide (EDB) by USEPA Method 504, and for lead by USEPA Method 239.2.

4.5 AQUIFER SLUG TESTS. Rising head slug tests were conducted October 20, 1993, in monitoring wells MW-4 and MW-6 to estimate the hydraulic conductivity (K) of the surficial aquifer.

The slug test developed by Bouwer and Rice (1976) measures the saturated K value using a single well. The test method used is termed a "rising head" test and is performed by quickly withdrawing a volume of water (slug) from the well and measuring the subsequent rate of the rising water level in the well. Bouwer (1989) recommends the rising head slug test for wells with screened intervals that are only partially submerged or partially penetrate unconfined aquifers.

The slug was constructed of 1-inch, outside diameter, PVC pipe, 5 feet in length, filled with sand, and capped watertight at both ends. The water level changes in the monitoring wells were recorded using a data logger and pressure transducer. The pressure transducer was suspended near the bottom of the well,

and an initial water level was recorded prior to beginning the test. The slug was then lowered into the well to a depth below the water table. Water levels were then recorded until they stabilized at the original level. The slug was quickly removed from the well, and the rate of the rising water level in the well was recorded until the water table had recovered to the initial value at the time of slug removal. Three tests were conducted in each well to obtain an average K value. Slug test graphs and calculations are attached in Appendix D, Aquifer Parameter Calculations.

4.6 **TIDAL INFLUENCE STUDY**. A 38-hour tidal study was conducted from 1800 hours on November 30, 1993, to 0730 hours on December 2, 1993. The purpose of the tidal study was to assess the effect tidal fluctuations had on water table elevations and the groundwater flow direction at the site. The study was conducted during a full moon in order to observe and measure larger than average tidal fluctuations over at least one tidal cycle. Tidal study methodologies and results are discussed in Appendix C, Tidal Influence Study.

5.0 CONTAMINATION ASSESSMENT RESULTS

5.1 SITE-SPECIFIC AQUIFER CHARACTERISTICS AND HYDROGEOLOGIC PARAMETERS. Depth to water, top of casing, and water table elevations recorded October 20, 1993, and December 4, 1993, are presented in Table 5-1. Water table elevation contour maps for each date are shown in Figures 5-1 and 5-2, respectively. (Note: water table elevations from the two vertical extent wells, MW-14D and MW-15D, were not used in water table elevation contouring.) The data from the shallow wells indicate a northeasterly groundwater flow direction at the site on both dates. The tidal influence study indicates that water table elevations and hydraulic gradients are tidally influenced; however, tides do not appear to change the northeastern groundwater flow direction (See Appendix C, Tidal Influence Study).

The calculated average hydraulic gradient at the site is 1.52×10^{-3} feet per foot (ft/ft). Slug test results indicate an average K value of 9.5×10^{-1} feet per day (ft/day). The calculated pore water velocity (V) is 4.8×10^{-3} ft/day. Equations and calculations used to estimate these values are presented in Appendix D, Aquifer Parameter Calculations.

5.2 CONTAMINANT PLUME CHARACTERIZATION.

5.2.1 Soil Contamination Assessment A summary of the soil sample OVA analyses is presented in Table 5-2. Groundwater laboratory analytical results indicate that both gasoline and kerosene-type constituents are present in groundwater at the site (see subsection 5.2.2). Therefore, the soil assessment follows Chapter 17-770, FAC, guidelines for the "Mixed Products Analytical Group". For the "Mixed Products Analytical Group" soil with OVA headspace readings greater than 10 ppm is considered to be petroleum contaminated, and soil with OVA headspace readings greater than 50 ppm is defined as "excessively contaminated" (FDER, May 1992). "Excessively contaminated" soil must be remediated (FDER, May 1992).

Four areas of excessively contaminated soil were identified by OVA headspace analysis (Figure 5-3). For each boring, OVA headspace readings presented in Figure 5-3 are the highest recorded for samples collected above the water table, either from 0 to 2 feet bls or from 2 to 4 feet bls. With few exceptions, the highest reading was recorded in the sample collected just above the water table, from 2 to 4 feet bls. Excessively petroleum-contaminated soil appears to be restricted to within 1 to 2 feet above the top of the water table.

The areal extent of excessively contaminated soil is shown within the 50 ppm isoconcentration lines. The most contaminated area is located southeast of Building A-133. This area is approximately 70 feet long and 40 feet wide. Three smaller isolated areas were identified: (1) in the vicinity of the former AVGAS ASTs surrounding soil boring SB-1, (2) on the northwest side of Building A-133 at soil boring SB-45, and (3) in the northern part of the site at soil boring SB-31.

5.2.2 Groundwater Contamination Assessment Groundwater analytical laboratory results for the samples collected October 19, 1993, are presented in Appendix E, Groundwater Analytical Data, and are summarized in Table 5-3. VOA, MTBE, PAH (including naphthalenes), TRPH, lead, and several chlorinated compounds were detected in groundwater samples. Free product was not detected in any monitoring

Table 5-1
Water Table Elevation Data,
October 18 and December 4, 1993

Contamination Assessment Report
Flying Club Site, Building A-127
Naval Air Station Key West
Boca Chica Field, Key West, Florida

Monitoring Well Number	Total Well Depth	Top of Casing Elevation[1]	October 18, 1993		December 4, 1993	
			Depth to Groundwater (from TOC)	Relative Groundwater Elevation[1]	Depth to Groundwater (from TOC)	Relative Groundwater Elevation[1]
MW-1	12	10.45	3.41	7.04	3.57	6.88
MW-2	12	10.56	3.78	6.78	3.85	6.71
MW-3	12	9.55	2.62	6.93	2.74	6.81
MW-4	12	10.70	3.58	7.12	3.78	6.92
MW-5	12	10.86	3.75	7.11	3.95	6.91
MW-6	12	10.69	3.71	6.98	3.86	6.83
MW-7	12	10.78	3.93	6.85	4.06	6.72
MW-8	12	10.64	3.88	6.76	3.98	6.66
MW-9	12	10.92	3.85	7.07	4.07	6.85
MW-10	12	10.55	3.70	6.85	3.84	6.71
MW-11	12	10.00	2.97	7.03	3.09	6.91
MW-12	12	10.56	3.76	6.80	3.87	6.69
MW-13	12	10.44	3.27	7.17	3.50	6.94
MW-14D	30	10.72	3.84	6.88	3.67	7.05
MW-15D	25	10.67	3.89	6.78	3.92	6.75
MW-16	12	10.84	3.69	7.15	3.91	6.93
MW-17	12	11.00	3.90	7.10	4.09	6.91
MW-18	12	10.91	3.91	7.00	4.09	6.82
MW-19	12	10.44	3.65	6.79	3.74	6.70
MW-20	12	10.35	3.38	6.97	3.52	6.83

[1]All elevations referenced to an arbitrary benchmark of 10.00 feet established at MW-11.

Note: TOC = top of casing.

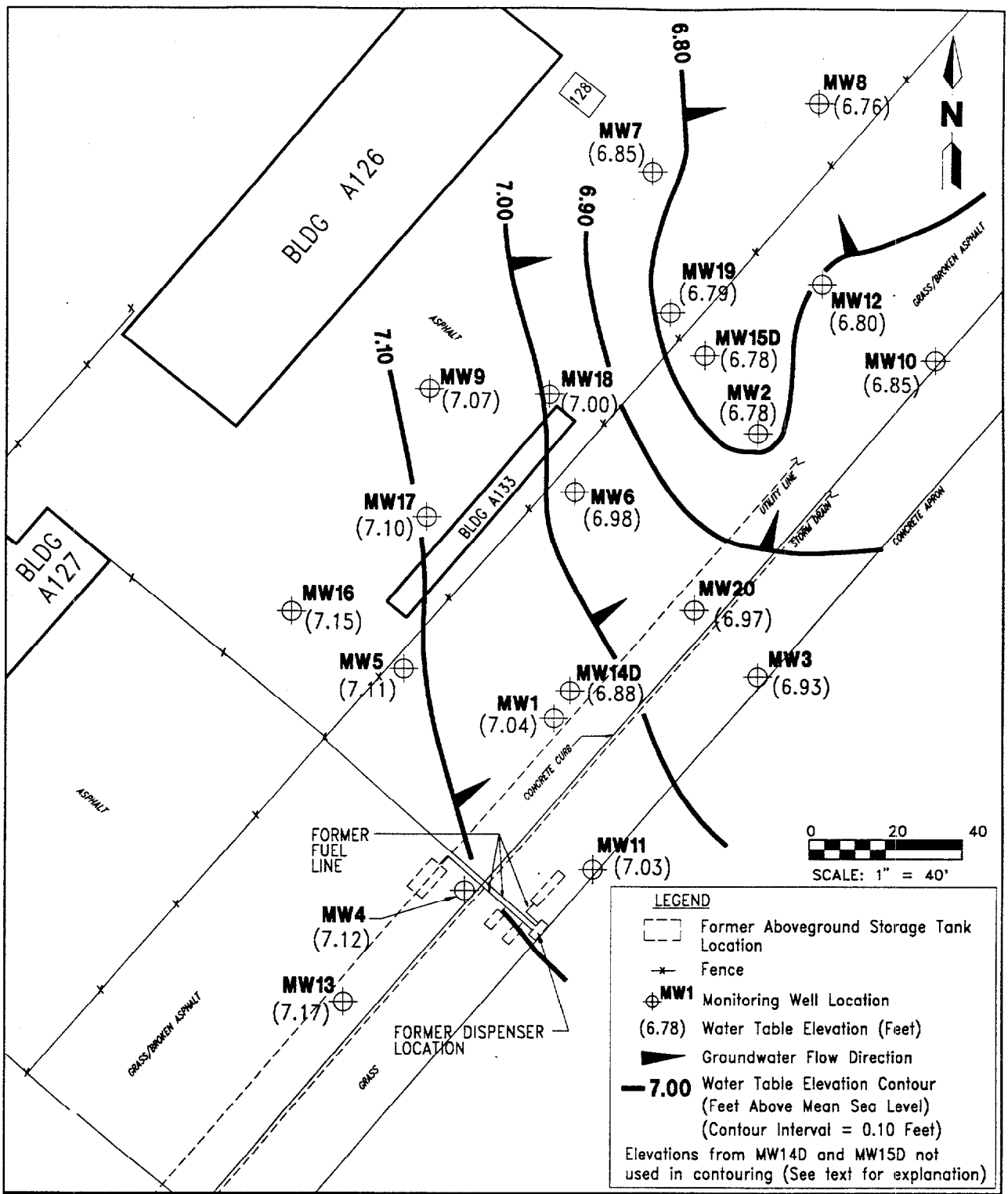

FIGURE 5-1
WATER TABLE ELEVATION CONTOUR MAP, OCTOBER 18, 1993

CONTAMINATION ASSESSMENT REPORT
FLYING CLUB SITE, BUILDING A-127

NAS KEY WEST
KEY WEST, FLORIDA

FLYCLUB/MAH/12/13/93

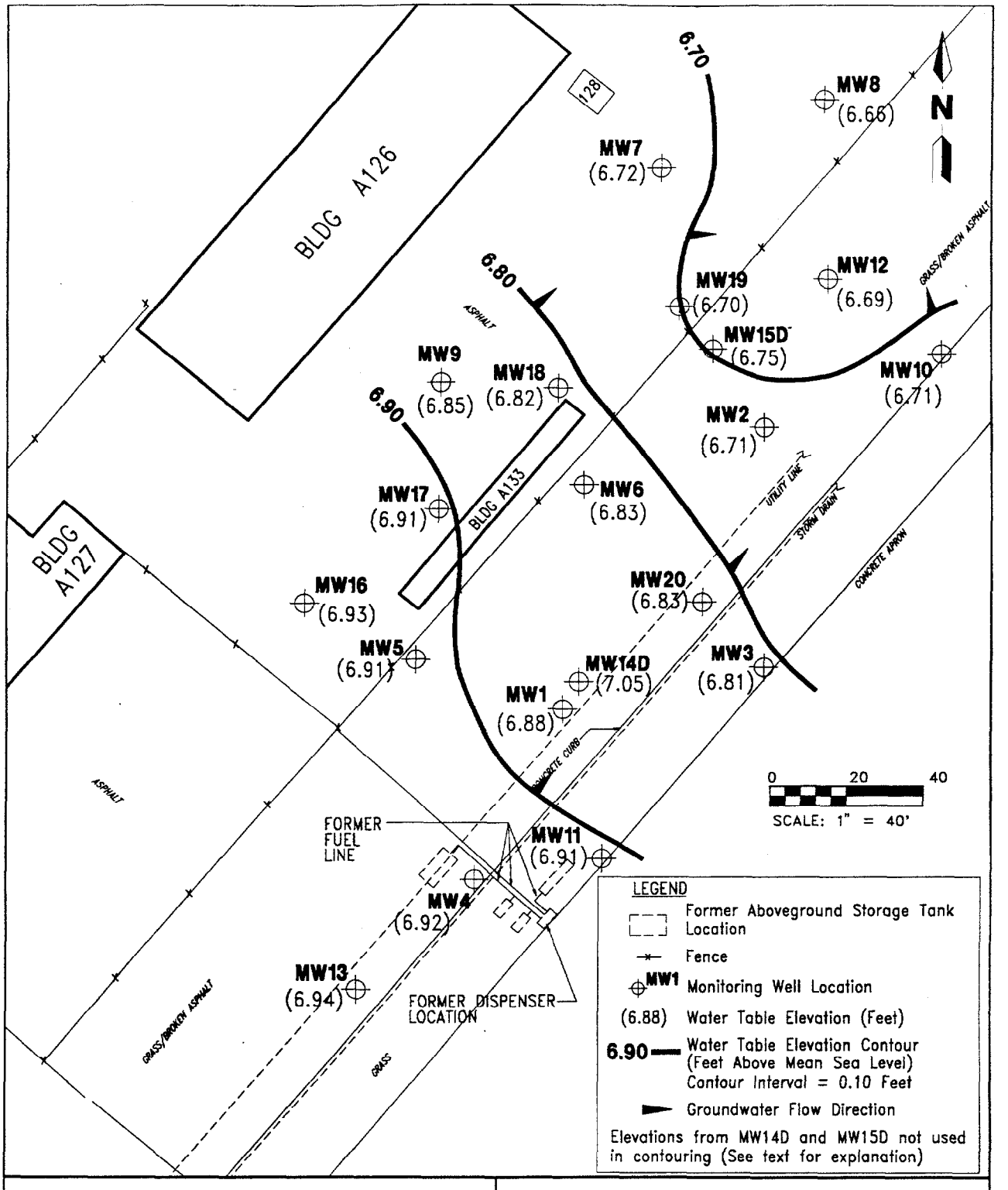

FIGURE 5-2
WATER TABLE ELEVATION CONTOUR MAP, DECEMBER 4, 1993

FLYCLUB/NWP/1/3/93

CONTAMINATION ASSESSMENT REPORT
FLYING CLUB SITE, BUILDING A-127

NAS KEY WEST
KEY WEST, FLORIDA

Table 5-2
Soil Sample Organic Vapor Analyzer (OVA) Analyses, October 13 through October 16, 1993

Contamination Assessment Report
Flying Club Site, Building A-127
Naval Air Station Key West
Boca Chica Field, Key West, Florida

Boring Designation	Depth (feet bls)	Concentration (ppm)	Comments	Boring Designation	Depth (feet bls)	Concentration (ppm)	Comments
SB1	0 to 2	1	No odor	SB8	0 to 2	8	
	2 to 4	60	Wet		2 to 4	1	No odor; wet
	4 to 6	2,500	Slight odor		4 to 6	1	
SB2	0 to 2	<1	No odor	SB9	0 to 2	<1	No odor
	2 to 4	<1			2 to 4	<1	Wet
	4 to 6	<1	Wet		4 to 6	1,100	Petroleum odor
SB3	0 to 2	<1	No odor	SB10	0 to 2	<1	Slight odor
	2 to 4	<1			2 to 4	<1	Wet
	4 to 6	245	Wet		4 to 6	250	Strong odor
SB4	0 to 2	<1	No odor	SB11	0 to 2	5	No odor
	2 to 4	<1			2 to 4	38	Slight odor
	4 to 6	14	Wet		4 to 6	900	Strong odor
SB5	0 to 2	<1	No odor	SB12	0 to 2	<1	Petroleum odor
	2 to 4	<1			2 to 4	16	Wet
	4 to 6	<1	Wet		4 to 6	1,500	Strong odor
SB6	0 to 2	<1	No odor	SB13	0 to 2	1,400	Petroleum odor
	2 to 4	<1	Wet		2 to 4	1,400	
	4 to 6	<1			4 to 6	1,450	Wet
SB7	0 to 2	<1	No odor	SB14	0 to 2	<1	Strong odor
	2 to 4	<1	Wet		2 to 4	6	Damp
	4 to 6	<1			4 to 6	1,450	Wet; strong odor

See notes at end of table.

Table 5-2 (Continued)
Soil Sample Organic Vapor Analyzer (OVA) Analyses, October 13 through October 16, 1993

Contamination Assessment Report
Flying Club Site, Building A-127
Naval Air Station Key West
Boca Chica Field, Key West, Florida

Boring Designation	Depth (feet bls)	Concentration (ppm)	Comments
SB15	0 to 2	2	No odor
	2 to 4	1	
	4 to 6	<1	Wet
SB16	0 to 2	<1	No odor
	2 to 4	<1	
	4 to 6	<1	Wet
SB17	0 to 2	<1	No odor
	2 to 4	<1	
	4 to 6	<1	Wet
SB18	0 to 2	<1	
	2 to 4	5	Petroleum odor
	4 to 6	345	Wet
SB19	0 to 2	<1	Slight odor
	2 to 4	12	Damp
	4 to 6	200	Petroleum odor
SB20	0 to 2	12	Strong odor
	2 to 4	<5	Damp
	4 to 6	<5	Wet
SB21	0 to 2	<1	
	2 to 4	<1	Wet; no odor
	4 to 6	<1	
SB22	0 to 2	1	Organics
	2 to 4	10	No odor; damp
	4 to 6	1,700	Fuel odor; wet
SB23	0 to 2	<1	No odor
	2 to 4	<1	Wet
	4 to 6	<1	
SB24	0 to 2	1	No odor
	2 to 4	1	
	4 to 6	5	Wet
SB25	0 to 2	1	No odor
	2 to 4	1	
	4 to 6	525	Wet
SB26	0 to 2	2	
	2 to 4	10	Petroleum odor
	4 to 6	1,900	Wet; strong odor
SB27	0 to 2	<1	Slight unknown odor
	2 to 4	<1	Wet; no odor
	4 to 6	<1	
SB28	0 to 2	<1	No odor
	2 to 4	<1	Damp
	4 to 6	6	Petroleum odor; wet

See notes at end of table.

Table 5-2 (Continued)
Soil Sample Organic Vapor Analyzer (OVA) Analyses, October 13 through October 16, 1993

Contamination Assessment Report
Flying Club Site, Building A-127
Naval Air Station Key West
Boca Chica Field, Key West, Florida

Boring Designation	Depth (feet bls)	Concentration (ppm)	Comments
SB29	0 to 2	3	No odor
	2 to 4	<1	Wet; no odor
	4 to 6	<1	
SB30	0 to 2	<1	No odor
	2 to 4	<1	Damp
	4 to 6	90	Petroleum odor; wet
SB31	0 to 2	<1	No odor
	2 to 4	800	Pinewood odor
	4 to 6	150	Petroleum odor
SB32	0 to 2	<1	No odor
	2 to 4	<1	Damp
	4 to 6	<1	Wet
SB33	0 to 2	<1	No odor
	2 to 4	<1	
	4 to 6	<1	Slight petroleum odor
SB34	0 to 2	<1	No odor
	2 to 4	<1	
	4 to 6	<1	Wet; organic odor
SB35	0 to 2	<1	No odor
	2 to 4	<1	
	4 to 6	<1	Wet
SB36	0 to 2	12	No odor
	2 to 4	7	Petroleum odor
	4 to 6	125	Wet
SB37	0 to 2	<1	Damp; no odor
	2 to 4	<1	
	4 to 6	<1	
SB38	0 to 2	<1	Petroleum odor
	2 to 4	<1	
	4 to 6	<1	No odor; wet
SB39	0 to 2	2	Slight odor
	2 to 4	1	Petroleum odor
	4 to 6	160	Wet
SB40	0 to 2	<1	No odor
	2 to 4	<1	
	4 to 6	<1	Wet
SB41	0 to 2	<1	Slight odor
	2 to 4	<1	
	4 to 6	2	Strong odor; wet
SB42	0 to 2	<1	No odor
	2 to 4	<1	Damp
	4 to 6	<1	Wet

See notes at end of table.

Table 5-2 (Continued)
Soil Sample Organic Vapor Analyzer (OVA) Analyses, October 13 through October 16, 1993

Contamination Assessment Report
Flying Club Site, Building A-127
Naval Air Station Key West
Boca Chica Field, Key West, Florida

Boring Designation	Depth (feet bls)	Concentration (ppm)	Comments	Boring Designation	Depth (feet bls)	Concentration (ppm)	Comments
SB43	0 to 2	<1	Slight odor	SB50	0 to 2	<1	No odor
	2 to 4	<1	Damp		2 to 4	<1	Wet
	4 to 6	<1	Wet		4 to 6	90	Slight odor
SB44	0 to 2	<1	No odor	SB51	0 to 2	2	Slight odor
	2 to 4	<1	Damp		2 to 4	<1	No odor; damp
	4 to 6	<1	Wet		4 to 6	65	
SB45	0 to 2	<1	Slight odor	SB52	0 to 2	<1	
	2 to 4	210	Damp		2 to 4	<1	
	4 to 6	800	Strong odor; wet		4 to 6	21	
SB46	0 to 2	<1	No odor	SB53	0 to 2	<1	
	2 to 4	<1			2 to 4	<1	
	4 to 6	<1	Wet		4 to 6	<1	
SB47	0 to 2	<1	No odor	SB54	0 to 2	<1	
	2 to 4	<1	Damp		2 to 4	<1	
	4 to 6	2	Wet		4 to 6	1	
SB48	0 to 2	1	No odor	SB55	0 to 2	<1	No odor
	2 to 4	1			2 to 4	<1	
	4 to 6	2,200	Petroleum odor; wet		4 to 6	<1	
SB49	0 to 2	<1	No odor	SB56	0 to 2	<1	
	2 to 4	<1			2 to 4	<1	
	4 to 6	950	Petroleum odor; wet		4 to 6	<1	

See notes at end of table.

Table 5-2 (Continued)
Soil Sample Organic Vapor Analyzer (OVA) Analyses,
October 13 through October 16, 1993

Contamination Assessment Report
Flying Club Site, Building A-127
Naval Air Station Key West
Boca Chica Field, Key West, Florida

Boring Designation	Depth (feet bls)	Concentration (ppm)	Comments
SB57	0 to 2	<1	
	2 to 4	<1	Wet
	4 to 6	<1	
SB58	0 to 2	<1	No odor
	2 to 4	<1	
SB59	0 to 2	<1	Slight odor
	2 to 4	<1	
SB60	0 to 2	<1	No odor
	2 to 4	<1	Damp
SB61	0 to 2	<1	No odor
	2 to 4	<1	Damp
SB62	0 to 2	<1	No odor
	2 to 4	<1	Damp
SB63	0 to 2	<1	No odor
	2 to 4	<1	
SB64	0 to 2	<1	No odor
	2 to 4	<1	Damp
SB65	0 to 2	24	Petroleum odor
	2 to 4	13	
SB66	0 to 2	25	Unknown odor
	2 to 4	>5,000	Strong odor
SB67	0 to 2	<1	No odor
	2 to 4	70	
SB68	0 to 2	7	No odor
	2 to 4	2,500	Petroleum odor
SB69	0 to 2	<1	No odor
	2 to 4	900	Damp; strong odor
SB70	0 to 2	38	Slight odor
	2 to 4	2,800	Damp; strong odor
SB71	0 to 2	<1	No odor
	2 to 4	2,300	Damp; strong odor

Notes: bls = below land surface.
ppm = parts per million.

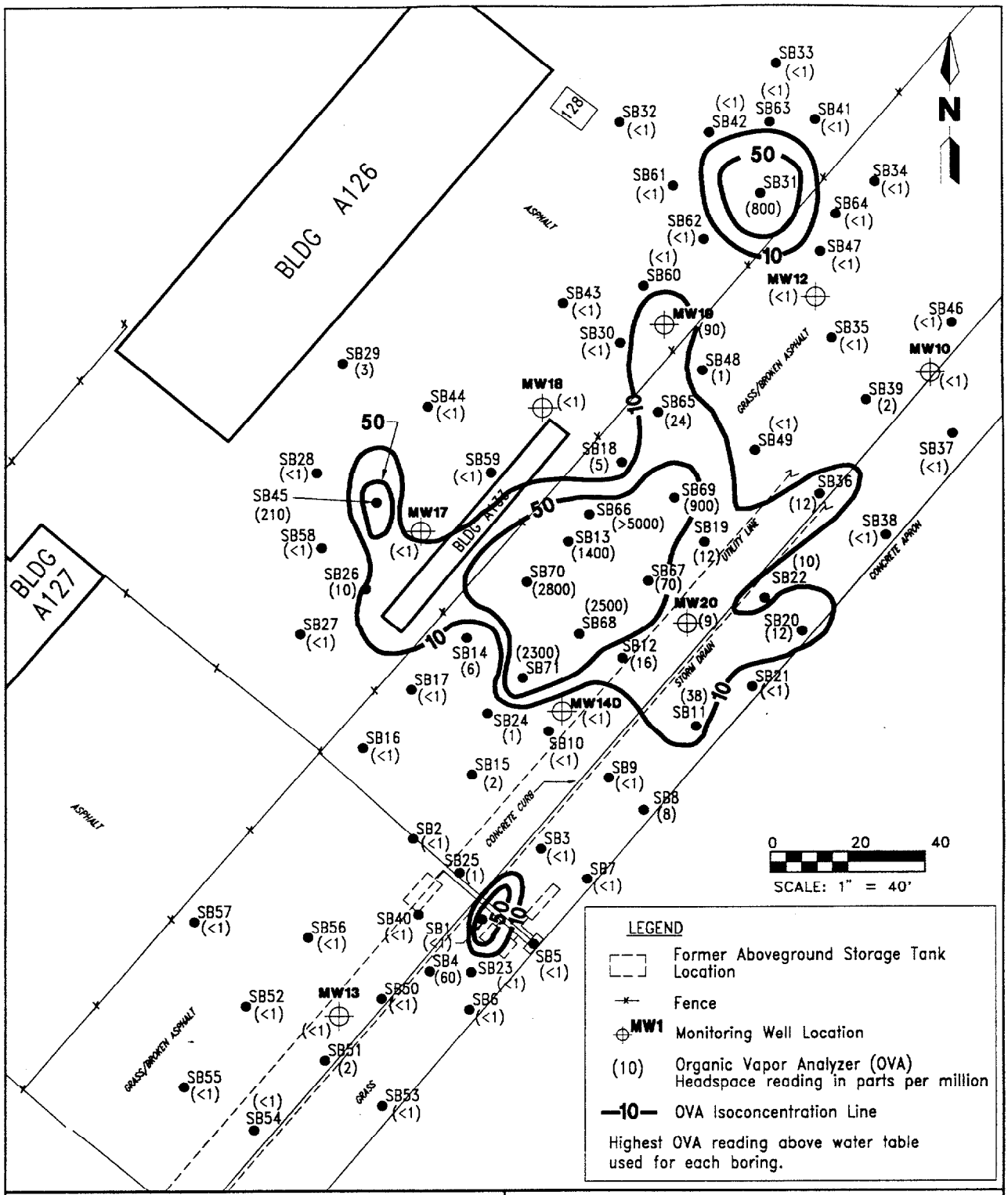

FIGURE 5-3
SOIL SAMPLE ORGANIC VAPOR ANALYZER (OVA) HEADSPACE READINGS

FLYCLUB/NMP/1/3/93

CONTAMINATION ASSESSMENT REPORT
FLYING CLUB SITE, BUILDING A-127

NAS KEY WEST
KEY WEST, FLORIDA

Table 5-3
Summary of Groundwater Analytical Results, October 19, 1993, Sampling Event

Contamination Assessment Report
Flying Club Site, Building A-127
Naval Air Station Key West
Boca Chica Field, Key West, Florida

Compound	Applied Guideline	MW 1	MW 2	MW 3	MW 4	MW 5	MW 6	DUP 1	MW 7	MW 8	MW 9	MW 10
Benzene	[1]200	13	150	1	710	<1	68	61	<1	<1	<1	2
Ethylbenzene		130	7	<1	<10	<1	140	120	<1	<1	<1	3
Toluene		12	10	<1	130	<1	15	14	<1	<1	<1	3
Xylenes		24	20	1	460	<1	82	74	<1	<1	<1	3
Total VOA	[1]200	179	187	2	1,300	ND	305	269	ND	ND	ND	11
MTBE	[2]50	25	<5	<1	11	<1	6	8	<1	<1	<1	1
Benzo(a)pyrene	[3]10	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Benzo(g,h,i)perylene	[3]10	12	<5	<5	<5	6	<5	<5	<5	<5	<5	<5
Dibenzo(a,h)anthracene	[3]10	9	<5	<5	<5	5	<5	<5	<5	<5	<5	<5
Indeno(1,2,3-cd)pyrene	[3]10	9	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Total PAH	[3]10	35	ND	ND	ND	11	ND	ND	ND	ND	ND	ND
1-Methylnaphthalene		18	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
2-Methylnaphthalene		48	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Naphthalene		120	<5	<5	<5	<5	<5	<5	7	<5	<5	<5
Total naphthalenes	[2]100	186	ND	ND	ND	ND	ND	ND	7	ND	ND	ND
TRPH	[1]5	3	2	<1	1	<1	2	2	<1	<1	<1	2
Lead	[1]50	9	<5	<5	46	5	<5	7	<5	<5	5	<5
Chlorobenzene	[3]10	<5	<5	<1	<10	<1	<5	<5	<1	3	<1	<1
1,2-Dichlorobenzene	[3]10	<5	<5	<1	<10	<1	<5	<5	<1	<1	<1	1
1,1-Dichloroethane	[3]2,400	<5	<5	<1	<10	<1	<5	<5	<1	<1	<1	<1
1,1-Dichloroethene	[3]7	<5	<5	<1	<10	<1	<5	<5	<1	<1	<1	<1
1,2-Dichloroethene	[3]4.2	<5	<5	<1	<10	<1	<5	<5	<1	1 (<1)	<1	<1
Methylene chloride	[3]5	16	11	3	<10	<1	<5	23	<1	<1	<1	<1
Trichloroethene	[3]3	<5	<5	<1	<10	<1	<5	<5	<1	<1	<1	<1

See notes at end of table.

Table 5-3 (Continued)
Summary of Groundwater Analytical Results,
October 19, 1993, Sampling Event

Contamination Assessment Report
Flying Club Site, Building A-127
Naval Air Station Key West
Boca Chica Field, Key West, Florida

Compound	Applied Guideline	DUP 2	MW 11	MW 12	MW 13	MW 14D	MW 15D	MW 16	MW 17	MW 18	MW 19	MW 20
Benzene	[1]200	1	<1	<1	<1	2	<1	<1	16	<1	<1	8
Ethylbenzene		2	<1	<1	<1	1	<1	<1	6	2	<1	96
Toluene		3	<1	<1	<1	<1	<1	<1	6	2	<1	12
Xylenes		2	<1	<1	<1	3	<1	<1	15	5	<1	40
Total VOA	[1]200	8	ND	ND	ND	6	ND	ND	43	9	ND	156
MTBE	[2]50	1	<1	<1	<1	7	<1	<1	3	<1	<1	12
Benzo(a)pyrene	[3]10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Benzo(g,h,i)perylene	[3]10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Dibenzo(a,h)anthracene	[3]10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Indeno(1,2,3-cd)pyrene	[3]10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Total PAH	[3]10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1-Methylnaphthalene		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
2-Methylnaphthalene		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Naphthalene		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Total naphthalenes	[2]100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TRPH	[1]5	<1	<1	<1	<1	<1	<1	<1	1	<1	1	2
Lead	[1]50	<5	65	<5	8	<5	<5	<5	7	<5	<5	14
Chlorobenzene	[3]10	<1	<1	<1	<1	<1	2	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	[3]10	1	<1	<1	<1	4	<1	<1	<1	<1	<1	1
1,1-Dichloroethane	[3]2,400	<1	<1	<1	<1	<1	11	<1	<1	<1	<1	<1
1,1-Dichloroethene	[3]7	<1	<1	<1	<1	<1	10	<1	<1	<1	<1	<1
1,2-Dichloroethene	[3]4.2	<1	<1	<1	<1	14(<1)	38(2)	<1	<1	2(3)	5(12)	<1
Methylene chloride	[3]5	2	<1	<1	45	6	7	1	21	<1	<1	1
Trichloroethene	[3]3	<1	<1	<1	<1	<1	1	<1	<1	<1	<1	<1

[1]Class G-III groundwater guidelines, Chapter 17-770, Florida Administrative Code.
[2]Class G-II groundwater guidelines, Chapter 17-770, Florida Administrative Code.
[3]Groundwater guidance concentration (FDER, February 1989).

Notes: All concentrations reported in parts per billion (ppb), except TRPH, which is reported in parts per million (ppm).
For 1,2-dichloroethene, concentrations for cis configurations is indicated first and concentration of trans configurations is indicated in parentheses. Total 1,2-dichloroethane (the sum of cis and trans configurations) concentrations are presented in Appendix E, Groundwater Analytical Data.
Methylene chloride was detected in the equipment blank, trip blank, and laboratory blank at concentrations of 14 ppb, 2 ppb, and 2 ppb, respectively.
DUP = duplicate sample. DUP1 was collected from monitoring well MW-6. DUP2 was collected from monitoring well MW-10.
Total VOA = total volatile aromatic hydrocarbons (the sum of benzene, ethylbenzene, toluene, and xylenes).
MTBE = methyl-tert-butyl ether.
ND = not detected at method detection limits.
Total PAH = total polynuclear aromatic hydrocarbons (the sum of PAH's, excluding naphthalenes).
Total naphthalenes is the sum of 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene.
TRPH = total recoverable petroleum hydrocarbons.

well or soil boring at the site. For petroleum compounds regulated under Chapter 17-770, FAC, Class G-III groundwater target levels will be used, where applicable. State target levels for G-III groundwater have been established for benzene (200 parts per billion [ppb]), total VOA (200 ppb), TRPH (5 ppm), and lead (50 ppb). (Total VOA is the sum of benzene, ethylbenzene, toluene, and xylenes).

Class G-III groundwater target levels have not been established for MTBE and PAH (including naphthalenes) and the chlorinated compounds detected in groundwater samples collected at the site. Groundwater target levels for MTBE and naphthalenes are available for Class G-II groundwater (Chapter 17-770, FAC). A target level of 100 ppb for total naphthalenes (the sum of naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene) has been established for Class G-II groundwater (Chapter 17-770, FAC). The MTBE target level in Class G-II groundwater is 50 ppb. For comparative purposes only, the Class G-II groundwater target levels for MTBE and naphthalenes will be applied herein, and PAH (excluding naphthalenes) and chlorinated hydrocarbon concentrations will be compared to State recommended guidance concentrations established by FDER (February 1989).

5.2.2.1 **Total Volatile Organic Aromatics (VOA) in Groundwater** VOAs were detected in samples collected from monitoring wells MW-1 through MW-4, MW-6, MW-10, MW-14D, MW-17, MW-18, and MW-20 (Figure 5-4). The State target level for G-III groundwater of 200 ppb for total VOA was exceeded in only the samples collected from monitoring wells MW-4 and MW-6. Total VOA concentrations for these samples were 305 ppb and 1,300 ppb, respectively. The areal extent of total VOA concentrations exceeding the State target level of 200 ppb is shown as two separate areas enclosed by the 200 ppb isoconcentration lines in Figure 5-4. The composite areal extent of both areas extends from the former locations of the AVGAS ASTs approximately 135 feet northeasterly to near the southeast corner of Building A-133.

Concentrations of benzene exceed the State target level for G-III groundwater in only the sample collected from monitoring well MW-4; in which the benzene concentration was 710 ppb. The approximate areal extent of benzene groundwater concentration above 200 ppb is shown in Figure 5-5. The highest concentrations of ethylbenzene (140 ppb, detected in the sample collected from monitoring well MW-6), toluene (130 ppb, detected in the sample collected from monitoring well MW-4), and xylenes (460 ppb, detected in the sample collected from monitoring well MW-4) are below current drinking water standards of 700 ppb, 1,000 ppb, and 10,000 ppb, respectively (Chapter 17-550, FAC).

The vertical extent of total VOA in groundwater does not appear to be significant. The total VOA concentration in the sample collected from monitoring well MW-14D, located in the approximate center of the total VOA plume, was 6 ppb, which is well below the State target level of 200 ppb. Total VOA were not detected in the sample collected from the other vertical extent monitoring well, MW-15D, which was screened from 20 to 25 feet bls and is located outside the total VOA plume.

5.2.2.2 **Methyl-tert-butyl Ether (MTBE) in Groundwater** MTBE was detected in groundwater samples collected from monitoring wells MW-1, MW-4, MW-6, MW-10, MW-14D, MW-17, and MW-20 (Figure 5-6). The areal extent of MTBE in groundwater is

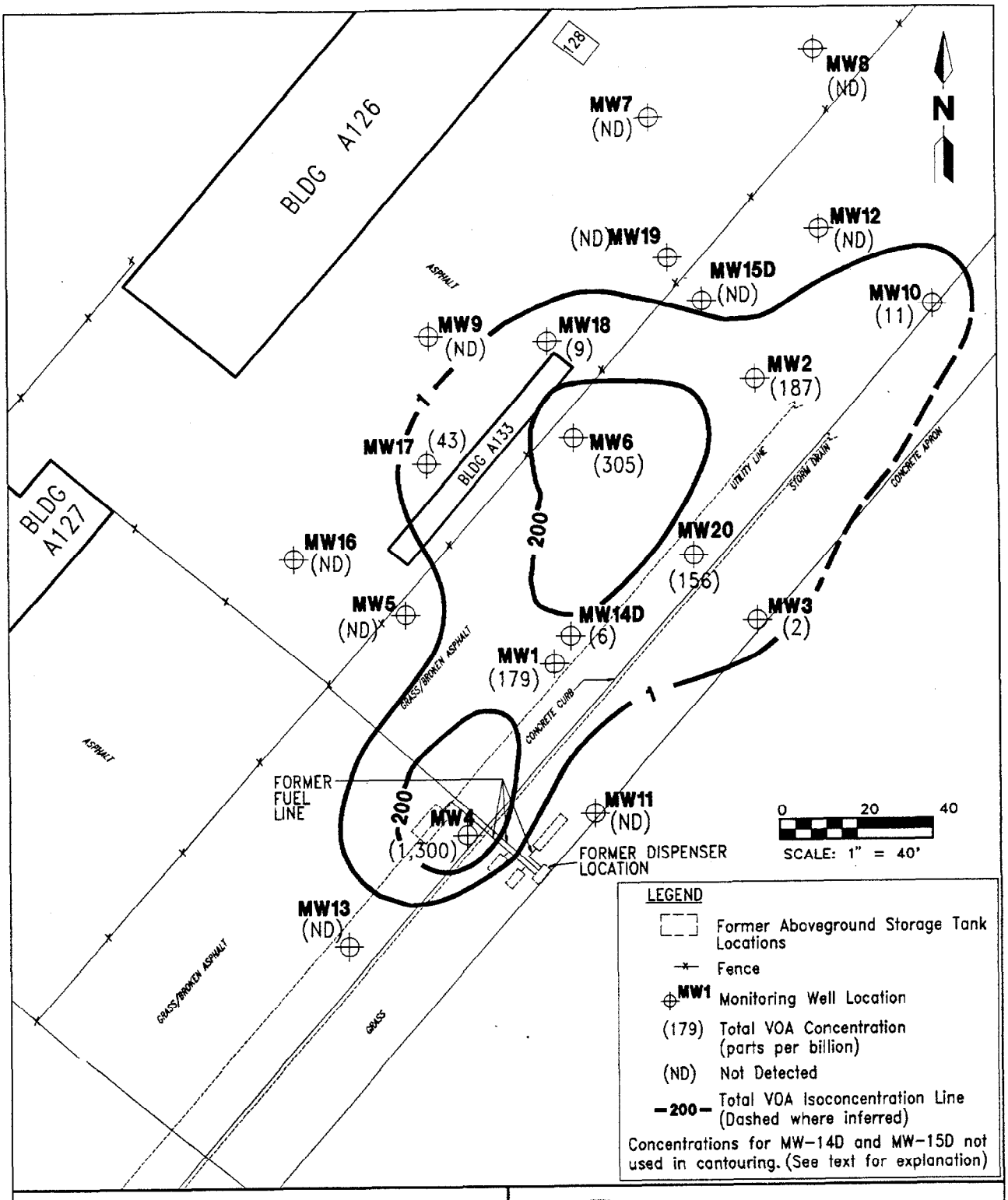

FIGURE 5-4
TOTAL VOLATILE ORGANIC AROMATICS (VOA) IN GROUNDWATER DISTRIBUTION MAP, OCTOBER 19, 1993

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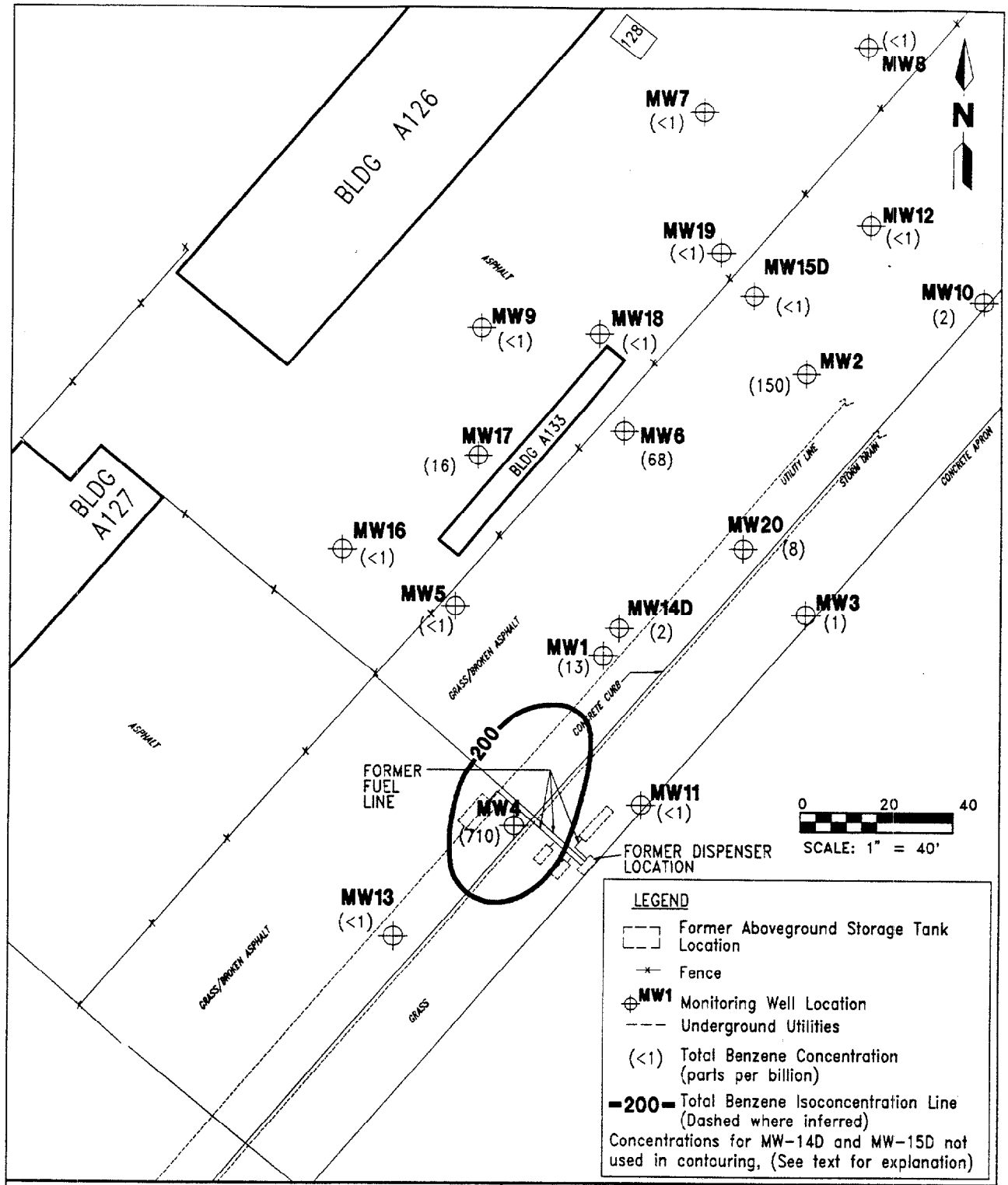

FIGURE 5-5
BENZENE IN GROUNDWATER DISTRIBUTION MAP
OCTOBER 19, 1993

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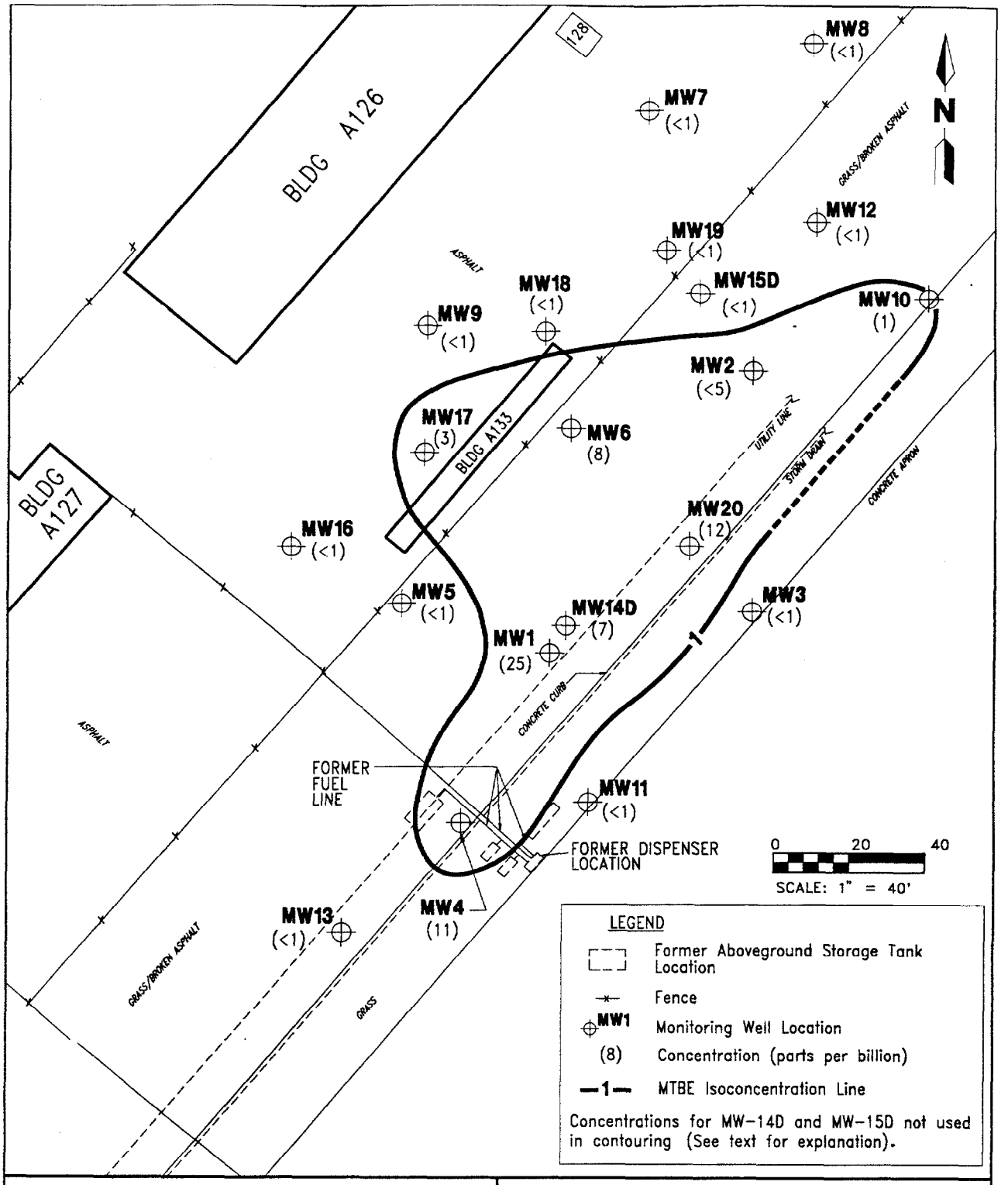

FIGURE 5-6
METHYL TERT-BUTYL ETHER IN GROUNDWATER DISTRIBUTION MAP, OCTOBER 19, 1993

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designated by the area inside the 1 ppb isoconcentration lines on Figure 5-6. Reported MTBE concentrations are below the State target level of 50 ppb for G-II groundwater. The highest MTBE concentration, 25 ppb, was detected in the sample collected from monitoring well MW-1, located downgradient of the former AVGAS ASTs. MTBE concentrations in groundwater appear to decrease with depth. A concentration of 7 ppb was also detected in the sample collected from monitoring well MW-14D, located adjacent to monitoring well MW-1. Because MTBE groundwater concentrations are below State target levels for G-II groundwater, MTBE in groundwater does not appear to be a concern at the site.

5.2.2.3 **Total Polynuclear Aromatic Hydrocarbons (PAH) (including Naphthalenes) in Groundwater** PAHs were detected in only the samples collected from monitoring wells MW-1, MW-5, and MW-7 (Table 5-3). PAHs detected in groundwater samples include naphthalene, 1-methylnaphthalene, 2-methylnaphthalene, benzo(a)pyrene, benzo(g,h,i)perylene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene.

Naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene, were detected in the sample collected from monitoring well MW-1, at concentrations of 120 ppb, 18 ppb, and 48 ppb, respectively. Naphthalene was also detected in the sample collected from monitoring well MW-7 at a concentration of 7 ppb. Total naphthalene concentrations exceeded the Class G-II groundwater target level of 100 ppb in only the sample collected from monitoring well MW-1, located approximately 50 feet downgradient of the former AVGAS ASTs (Figure 5-7). The areal extent of total naphthalenes in groundwater exceeding 100 ppb is approximated by the 100 ppb isoconcentration lines on Figure 5-7.

PAH (excluding naphthalenes) were detected in only the samples collected from monitoring wells MW-1 and MW-5. Total PAH (excluding naphthalenes) concentrations are presented in Table 5-3 and are graphically shown on Figure 5-7. Benzo(a)pyrene, benzo(g,h,i)perylene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene were detected in the sample collected from monitoring well MW-1, at concentrations of 5 ppb, 12 ppb, 9 ppb, and 9 ppb, respectively. Benzo(g,h,i)-perylene and dibenzo(a,h)anthracene were also detected in the sample collected from monitoring well MW-5 at concentrations of 6 ppb and 5 ppb, respectively. The groundwater guidance concentration for a particular PAH is 10 ppb (FDER, February 1989). The areal extent of PAH (excluding naphthalenes) groundwater concentrations exceeding the groundwater guidance concentration is enclosed within the 10 ppb isoconcentration lines on Figure 5-7. This area approximately coincides with the 100 ppb total naphthalenes isoconcentration lines, but extends closer to Building A-133 in the vicinity of monitoring well MW-5.

The vertical extent of PAH (including naphthalenes) in groundwater does not appear to extend below 25 feet bls. PAHs (including naphthalenes) were not detected in monitoring well MW-14D, which is located next to monitoring well MW-1 and is screened from 25 to 30 feet bls.

5.2.2.4 **Total Recoverable Petroleum Hydrocarbons (TRPH) in Groundwater** TRPH were detected in the samples collected from monitoring wells MW-1, MW-2, MW-4, MW-6, MW-10, MW-17, MW-19, and MW-20 (Figure 5-8). All reported TRPH concentrations were below the State target level of 5 ppm for Class G-III groundwater. The highest TRPH concentration (3 ppm) was detected in the sample collected from monitoring well MW-1, located approximately 50 feet downgradient of the former AVGAS ASTs.

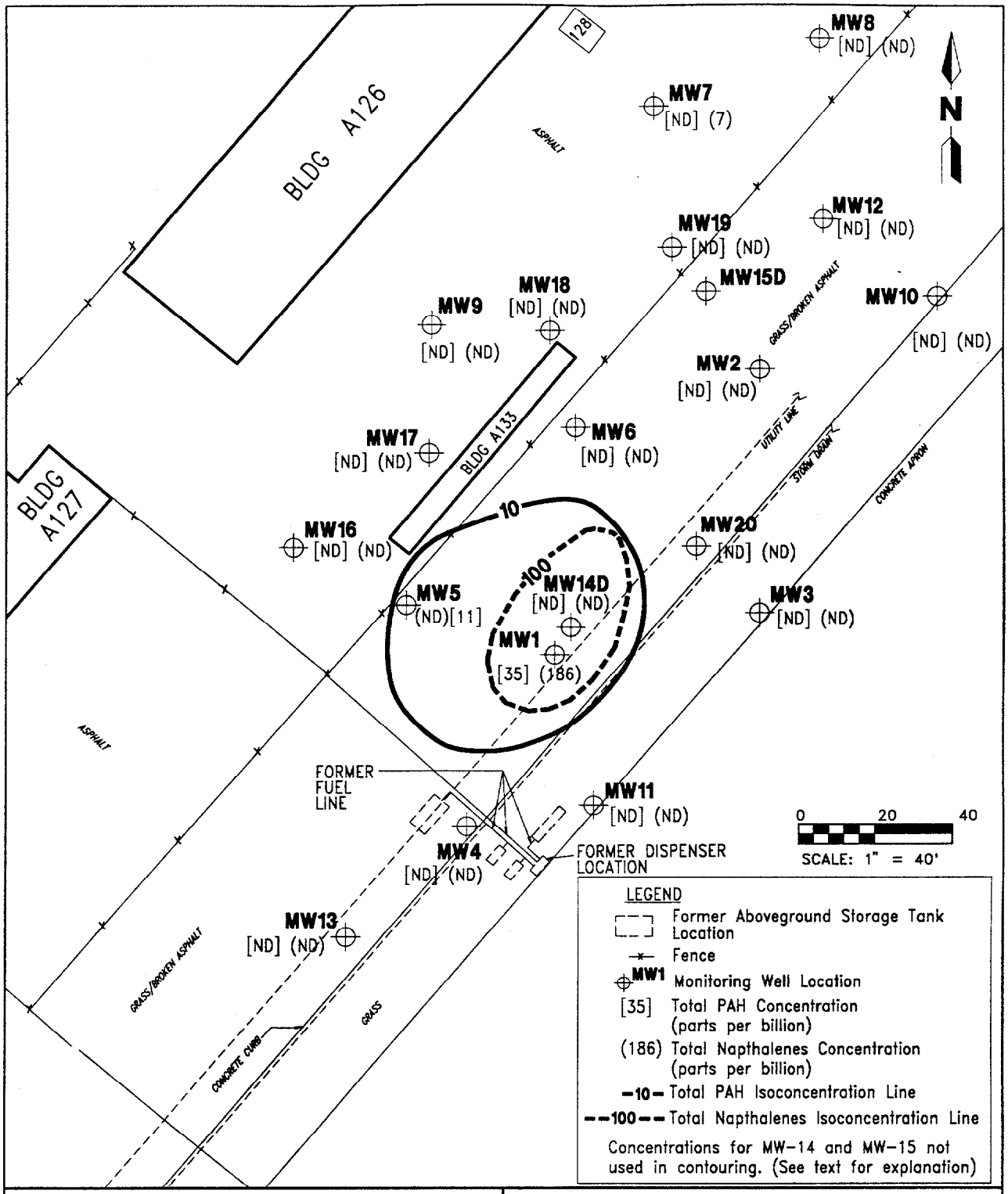

FIGURE 5-7
TOTAL PAH AND TOTAL NAPTHALENES IN GROUNDWATER DISTRIBUTION MAP, OCTOBER 19, 1993

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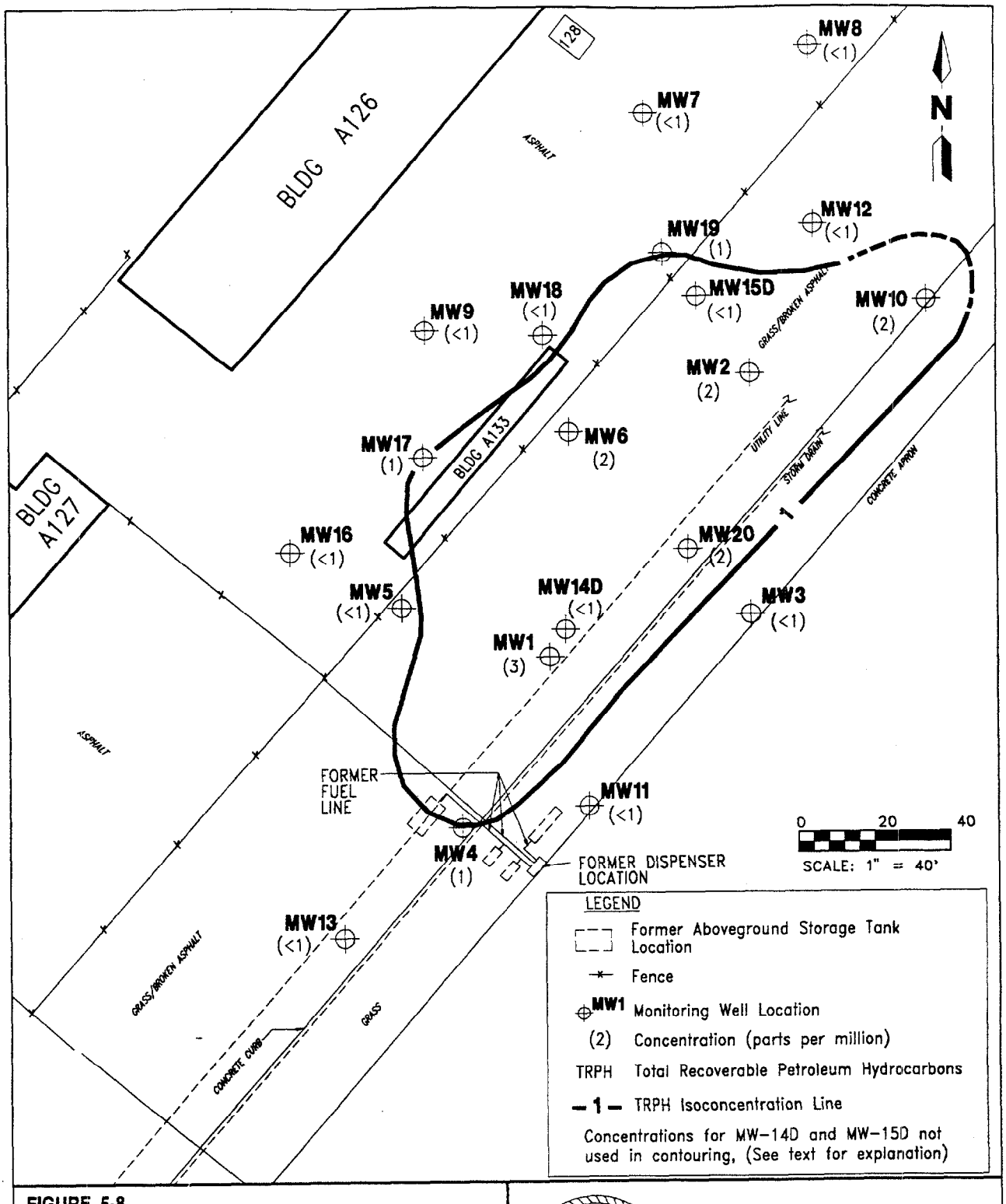

FIGURE 5-8
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS GROUNDWATER DISTRIBUTION MAP, OCTOBER 19, 1993

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Groundwater analytical data indicate the vertical extent of TRPH in groundwater does not extend below 25 feet bls. TRPHs were not detected (<1 ppm) in samples collected from the vertical extent monitoring wells (MW-14D and MW-15D).

5.2.2.5 Lead in Groundwater Lead was detected in the samples collected from monitoring wells MW-1, MW-4, MW-5, MW-6, MW-9, MW-11, MW-13, MW-17, and MW-20, at concentrations ranging from 5 ppb to 65 ppb (Figure 5-9). Lead concentrations exceeded the State target level of 50 ppb for Class G-III groundwater in only the sample collected from monitoring well MW-11 (65 ppb). Monitoring well MW-11 is located in the vicinity of the former AVGAS ASTs. Lead was not detected in the samples collected from the two vertical extent monitoring wells (MW-14D and MW-15D).

5.2.2.6 Chlorinated Compounds in Groundwater Seven chlorinated compounds were detected in groundwater samples. These include chlorobenzene, 1,2-dichlorobenzene (1,2-DCB), 1,1-dichloroethane (1,1,-DCA), 1,1-dichloroethene (1,1,-DCE), 1,2-dichloroethene (1,2-DCE), methylene chloride, and trichloroethene (TCE).

Chlorobenzene was detected in only the samples collected from monitoring wells MW-8 and MW-15D, at concentrations of 3 ppb and 2 ppb, respectively. These concentrations are less than the State groundwater guidance concentration of 10 ppb (FDER, February 1989).

The compound 1,2-DCB was detected in only the samples collected from monitoring wells MW-10 and MW-14D, at concentrations of 1 ppb and 4 ppb, respectively. These concentrations are less than the State groundwater guidance concentration of 10 ppb (FDER, February 1989). The compound 1,1-DCA was detected in only the sample collected from monitoring well MW-15D, at a concentration of 11 ppb, which is well below the State groundwater guidance concentration of 2,400 ppb (FDER, February 1989). The compound 1,1-DCE was detected in only the sample collected from monitoring well MW-15D, at a concentration of 10 ppb, which slightly exceeds the State groundwater guidance concentration of 7 ppb (FDER, February 1989).

The compound 1,2-DCE was detected in the samples collected from monitoring wells MW-8, MW-14D, MW-15D, MW-18, and MW-19. Concentrations of *cis* 1,2-DCE (Table 5-3) exceed the State groundwater guidance concentration (FDER, February 1989) of 4.2 ppb in the samples collected from monitoring wells MW-14D (14 ppb), MW-15D (38 ppb), and MW-19 (5 ppb). Concentrations of *trans* 1,2-DCE (indicated in parentheses in Table 5-3) exceed the groundwater guidance concentration of 4.2 ppb (FDER, February 1989) in only the sample collected from monitoring well MW-19 (12 ppb). It should be noted that although 1,2-DCE concentrations exceed groundwater guidance concentrations established by FDER (February 1989), *cis* 1,2-DCE and *trans* 1,2-DCE concentrations do not exceed the current primary drinking water standards of 70 ppb (USEPA, May 1993) and 100 ppb (Chapter 17-550, FAC), respectively. Total 1,2-DCE concentration (the sum of the concentrations of *cis* 1,2-DCE and *trans* 1,2-DCE) are reported in Appendix E, Groundwater Sample Analytical Data. (Note: in some instances the "total' result may not equal the sum of the *cis* and *trans* configurations due to rounding of results prior to reporting.)

TCE was detected in only the sample collected from monitoring well MW-15D, at a concentration of 1 ppb, which is less than the State groundwater guidance concentration of 3 ppb (FDER, February 1989).

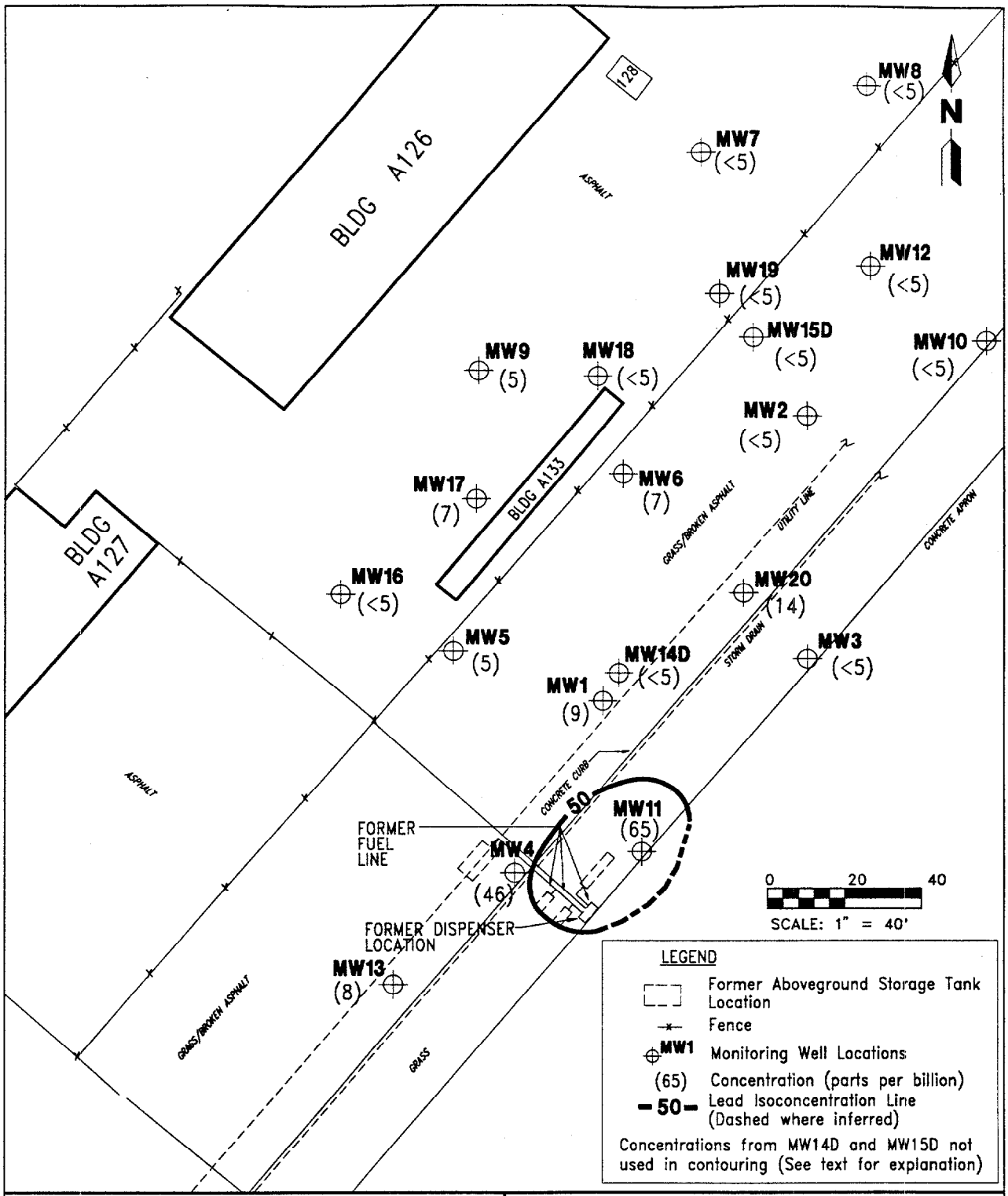

FIGURE 5-9
LEAD IN GROUNDWATER DISTRIBUTION MAP, OCTOBER 19, 1993

FLYCLUB/MAH/1/3/93

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Concentrations of methylene chloride detected in samples collected from monitoring wells MW-1, MW-2, MW-3, MW-6, MW-10, MW-13, MW-14D, MW-15D, MW-16, MW-17, and MW-20, ranged from 1 ppb to 45 ppb. Methylene chloride concentrations detected in the equipment blank, the trip blank, and the laboratory blank were 14 ppb, 2 ppb, and 2 ppb, respectively. It appears that methylene chloride detected in groundwater samples is the result of laboratory contamination. For this reason, methylene chloride data are not presented on Figure 5-10.

5.3 **POTABLE WELL SURVEY**. Research of facility records indicate there are no potable wells on Boca Chica Key. Potable water at Boca Chica Field is imported from mainland Florida through the Florida Keys Aqueduct.

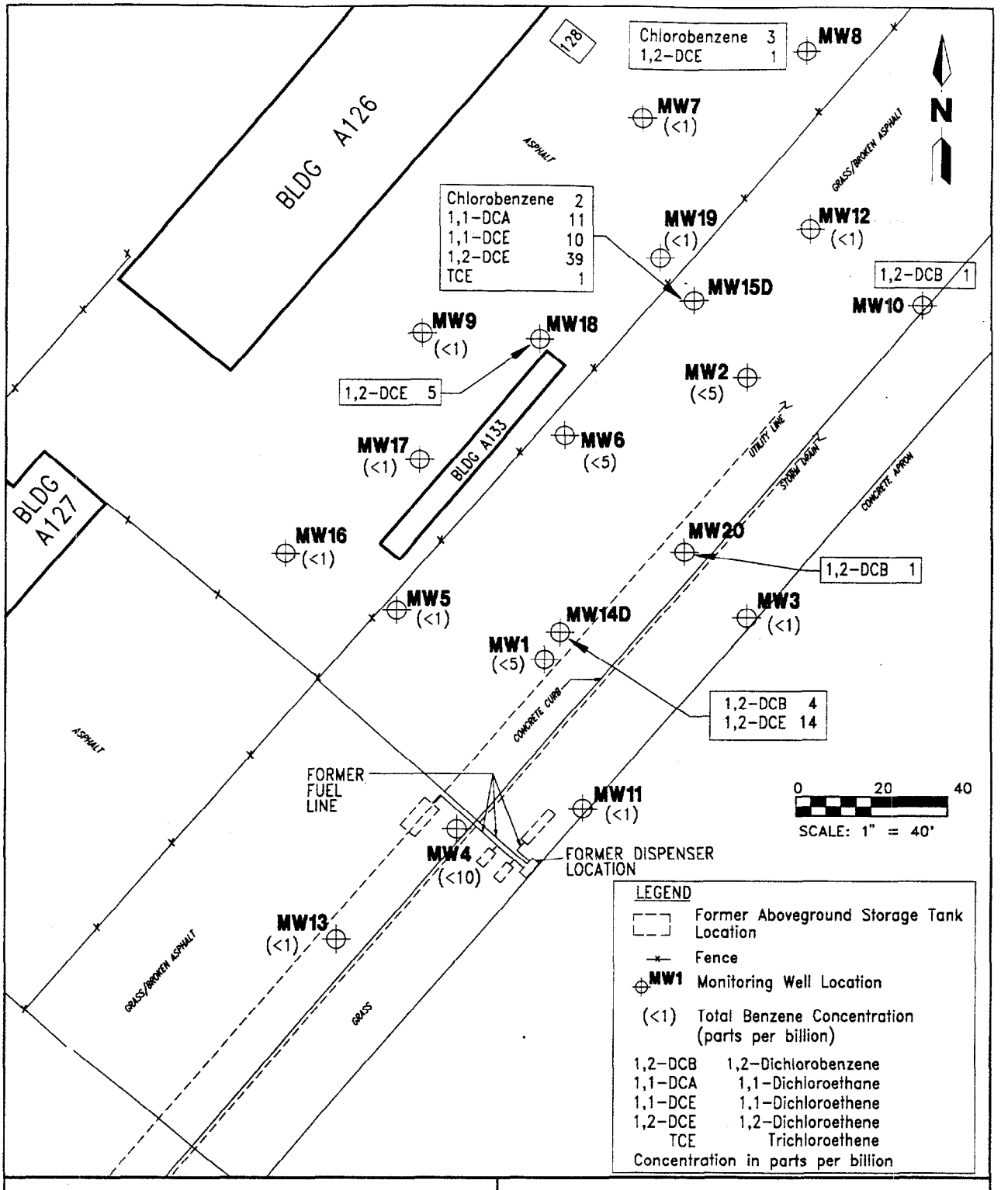

FIGURE 5-10
CHLORINATED HYDROCARBONS IN GROUNDWATER DISTRIBUTION MAP, OCTOBER 19, 1993

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6.0 SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

6.1 SUMMARY. Based on the findings of the CA field investigations and laboratory analytical results, the following is a summary of existing conditions at the site.

- The primary water-bearing zone of concern at the site is the surficial aquifer. The surficial aquifer in the Boca Chica area is unconfined. Water quality data indicate that the surficial aquifer in the Key West area is an unlikely source of potable water (McKenzie, 1990); thus, the surficial aquifer is treated herein as a Class G-III groundwater source.

- The surficial aquifer was penetrated to a depth of 32 feet bls during this investigation. Indigenous subsurface material is generally composed of a mixture of oolitic sand; light gray, non-plastic clay; and limestone gravel.

- The water table at the site was encountered at depths ranging from 2.5 to 4.5 feet bls.

- The direction of groundwater flow in the surficial aquifer is to the northeast. A tidal influence study indicates that groundwater elevations are tidally affected; however, the direction of groundwater flow appears to be consistently to the northeast.

- Four separate areas of excessively contaminated soil were indicated by OVA headspace analyses. The most extensive soil contamination was detected along the southeast side of Building A-133 (Figure 5-3). Excessive soil contamination appears to be restricted to within 1 to 2 feet above the top of the water table.

- Total VOA, MTBE, PAH (including naphthalenes), TRPH, lead, and several chlorinated compounds were detected in groundwater samples. Total VOA, TRPH, and lead State target levels for Class G-III groundwater were applied (Chapter 17-770, FAC). Because Class G-III groundwater target levels are not available for the other contaminants, other standards were applied for comparative purposes. MTBE and total naphthalenes concentrations were compared to Class G-II groundwater target levels (Chapter 17-770, FAC). PAH (excluding naphthalenes) and chlorinated compound concentrations were compared to State groundwater guidance concentrations (FDER, February 1989).

- State target levels for Class G-III groundwater were exceeded for total VOA, benzene, and lead (See Figures 5-4, 5-5, and 5-9, respectively). Total VOA concentrations exceeded the State target level of 200 ppb in only the samples collected from monitoring wells MW-4 (1,300 ppb) and MW-6 (305 ppb). Lead exceeded the State target level of 50 ppb in only the sample collected from monitoring well MW-11 (65 ppb). TRPH concentrations were below the State target level of 5 ppm for Class G-III groundwater.

- Total naphthalenes concentrations exceed the State target level of 100 ppb for G-II groundwater in only the sample collected from monitoring well MW-1 (186 ppb) (See Figure 5-7). PAH concentrations exceed the State groundwater guidance concentration of 10 ppb in only the samples collected from monitoring wells MW-1 (35 ppb) and MW-6 (11 ppb).

- Concentrations of 1,1-DCE and 1,2-DCE exceed the State groundwater guidance concentrations of 7 ppb and 4.2 ppb, respectively. Concentrations of 1,1-DCE were detected in only the sample collected from monitoring well MW-15D (10 ppb). Concentrations of 1,2-DCE are below current drinking water standards (Chapter 17-550, FAC).

- No potable water sources were identified within a 0.25-mile radius of the site. There are no potable wells on Boca Chica Key.

- No free product was found in any site monitoring wells.

6.2 CONCLUSIONS. Based on the findings of the CA and site conditions, the following can be concluded.

- Excessively contaminated soil directly above the water table may be an indication of residual groundwater contamination rather than soil contamination. The highest OVA headspace readings were almost exclusively recorded in samples collected just above the water table. The tidal influence study indicates that significant variations in water table elevations as a result of tidal fluctuations occur at the site. The vertical movement of the groundwater as a result of tidal fluctuations will cause a spreading of contamination in the soil both immediately above and below the water table (see Appendix D, Tidal Influence Study). The high OVA readings recorded in soil samples collected just above the water table may be the result of residual groundwater contamination during periods of low water table elevations.

- The areal extent of groundwater contamination exceeding applicable (and compared) standards appears to be restricted to the vicinity of the former AVGAS ASTs and along the southeast side of Building A-133, near the former motor pool refueling point.

- Benzene is the major contaminant of concern at the site. Benzene concentrations exceed the State target level of 200 ppb for Class G-III groundwater in only the sample collected from monitoring well MW-4 (710 ppb) (see Figure 5-5).

- Groundwater petroleum contamination appears to decrease with depth. With the exception of 1,1-DCE, which was detected in the sample collected from vertical extent monitoring well MW-15D, contaminant concentrations were either not detected or were below applicable (or compared) standards in the samples collected from the vertical extent wells, MW-14D and MW-15D.

- The reported sources of groundwater contamination, the AVGAS ASTs, associated piping and dispensers, and the gasoline USTs located at the

former motor pool refueling point near Building A-133, have been removed from the site.

- Because there are no potable water sources at Boca Chica Field, the risk to human health caused by groundwater contamination at the site appears to be low.

- There is no evidence indicating that groundwater contaminants are migrating off the site. There are no surface water bodies that appear to be threatened by the contaminated area. Therefore, groundwater contamination at the site appears to be a low risk to area fish and wildlife.

6.3 **RECOMMENDATIONS**. Based on the findings, conclusions, and interpretations of the CA, ABB-ES recommends that groundwater remediation be implemented at the site to comply with State regulations regarding concentrations of benzene, lead, and total VOA in Class G-III groundwater. The manner of groundwater remediation will be presented in a remedial action plan (RAP), which will be developed pending FDEP approval of this CAR.

7.0 PROFESSIONAL REVIEW CERTIFICATION

This contamination assessment report was prepared using sound hydrogeologic principles and judgment. This assessment is based on the geologic investigation and associated information detailed in the text and appended to this report. If conditions are determined to exist that differ from those described, the undersigned geologist should be notified to evaluate the effects of any additional information on the assessment described in this report. This Contamination Assessment Report was developed for the Flying Club Site, Building A-127, at Boca Chica Field, Naval Air Station, Key West, Florida, and should not be construed to apply to any other site.

Roger Durham
Professional Geologist
P.G. No. 1127

APRIL 2, 1994
Date

REFERENCES

Bouwer, H. 1989, The Bouwer and Rice slug test, an update: Groundwater, vol. 127, p. 304-309.

Bouwer, H., and Rice, R.C., 1976, A slug test method for determining hydraulic conductivity of unconfined aquifers with completely or partially penetrating wells: Water Resources Research, vol. 12, no. 3, p. 423-428.

Davis, S.N., and DeWiest, R.J.M., 1966, Hydrogeology: New York, John Wiley & Sons, Inc., 463 p.

Florida Department of Environmental Regulation, February 1989, Groundwater guidance concentrations: compiled by R. Merchant, Division of Water Facilities, 14 p.

Florida Department of Environmental Regulation, May 1992, Guidelines for assessment and remediation of petroleum contaminated soils, revised: Division of Waste Management, 39 p.

Geraghty & Miller, 1989, AQTESOLV™, aquifer test design and analysis: computer program version 1.00.

Hoffmeister, J.E., 1974, Land from the sea, the geologic story of south Florida: Coral Gables, University of Miami Press, 143 p.

McKenzie, D.J., 1990, Water resources potential of the freshwater lens at Key West, Florida: U.S. Geological Survey Water-Resources Investigations Report 90-4115, 24 p.

U.S. Department of Commerce, 1990, East coast of North and South America tide tables, 1991, High and Low Water Predictions: National Oceanic and Atmospheric Administration.

U.S. Environmental Protection Agency, May 1993, Drinking water regulations and health advisories: Office of Water, 13 p.

U.S. Geological Survey, 1971, Boca Chica Key, Florida, quadrangle: 7.5-minute orthophotographic series.

White, W.A., 1970, The geomorphology of the Florida peninsula: Florida Bureau of Geology Bulletin No. 51, 164 p.

APPENDIX A

SITE CONDITIONS

Regional and Local Physiography

The State of Florida is divided into three geomorphic zones: the northern or proximal zone, the central or mid-peninsular zone, and the southern or distal zone (White, 1970). Boca Chica Key is part of the Lower Keys and is located entirely within the southern or distal zone. This area is characterized by a sparse veneer of residual soil and surface vegetation overlying eroded limestone. The topography of the Lower Keys is generally smooth and flat in the center of the key and slopes gently downward toward the shoreline (White, 1970).

Regional and Local Hydrogeology

The Lower Keys are overlain by an oolitic member of the Pleistocene Miami Limestone. The Key Largo coral reef limestone underlies the Miami Limestone. Hoffmeister (1974) reported that the Miami Limestone is 27 feet thick and the Key Largo Limestone is greater than 270 feet thick in the western part of Key West. The Key Largo Limestone is generally more porous than the Miami Limestone. Surficial and shallow subsurface features in the area have often been altered by imported fill material.

The surficial aquifer in the Boca Chica area is unconfined. The water table is found at shallow depths in the area, generally occurring from less than 1 foot to 10 feet below land surface. The surficial aquifer is contained within the Miami Limestone, the underlying Key Largo Limestone, and surficial fill materials. The limestones generally contain brackish or saline water. Recharge to the aquifer is directly from precipitation, and infiltration rates are rapid. Groundwater flow discharge is to surrounding surface waters.

APPENDIX B

LITHOLOGIC LOGS

TITLE: NAS Key West, Flying Club		LOG of WELL: KYW-A127-1	BORING NO. SB10
CLIENT: SOUTHNAVFACENGCOM			PROJECT NO: 8508-30
CONTRACTOR: Groundwater Protection, Inc.		DATE STARTED: 10/15/93	COMPLTD: 10/15/93
METHOD: 4.25" HSA	CASE SIZE: 2 inch	SCREEN INT.: 2 - 12 FT.	PROTECTION LEVEL: D
TOC ELEV.: 10.45 FT.	MONITOR INST.: OVA	TOT DPTH: 12FT.	DPTH TO ▽ 3.57 FT.
LOGGED BY: J. Koch	WELL DEVELOPMENT DATE: 10/15/93		SITE: NAS Key West, Flying Club

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				0	SAND: silty, clayey, calcareous, medium brown to light brown, fine- coarse-grained. *Slight odor.*		SC		
				0	SAND: clayey, calcareous, light brown to gray, fine- to coarse-grained with gravel. *Slight odor.*		GC		
5				250	As above. *Strong odor.*				
10									
15									

ABB ENVIRONMENTAL SERVICES, INC.

TITLE: NAS Key West, Flying Club	LOG of WELL: KYW-A127-2		BORING NO. SB49
CLIENT: SOUTHNAVFACENGCOM			PROJECT NO: 8508-30
CONTRACTOR: Groundwater Protection, Inc.		DATE STARTED: 10/15/93	COMPLTD: 10/15/93
METHOD: 4.25" HSA	CASE SIZE: 2 inch	SCREEN INT.: 2 - 12 FT.	PROTECTION LEVEL: D
TOC ELEV.: 10.56 FT.	MONITOR INST.: OVA	TOT DPTH: 12FT.	DPTH TO ▽ 3.85 FT.
LOGGED BY: J. Koch	WELL DEVELOPMENT DATE: 10/15/93		SITE: NAS Key West, Flying Club

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				0	SAND: clayey, calcareous, light brown to white, fine- to coarse- grained with gravel. *No odor.*		GC		
				0					
5				950	SAND: clayey, calcareous, light brown to gray, fine- to coarse- grained with gravel. *Strong petroleum odor.*				
					SAND: clayey, calcareous, medium gray, fine- to coarse-grained with gravel. *Slight petroleum odor.*				
10									
15									

TITLE: NAS Key West, Flying Club	**LOG of WELL:** KYW-A127-3		**BORING NO.** SB21
CLIENT: SOUTHNAVFACENGCOM			**PROJECT NO:** 8508-30
CONTRACTOR: Groundwater Protection, Inc.		**DATE STARTED:** 10/15/93	**COMPLTD:** 10/15/93
METHOD: 4.25" HSA	**CASE SIZE:** 2 inch	**SCREEN INT.:** 2 - 12 FT.	**PROTECTION LEVEL:** D
TOC ELEV.: 9.55 FT.	**MONITOR INST.:** OVA	**TOT DPTH:** 12FT.	**DPTH TO ▽** 2.74 FT.
LOGGED BY: R. Durham, J. Koch	**WELL DEVELOPMENT DATE:** 10/15/93		**SITE:** NAS Key West, Flying Club

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				<1			LS		
				<1	LIMESTONE: sandy, fine-grained, mixed with gravel, light brown. *No odor.*				
							SP		
5				<1	SAND: calcareous, light brown, silty to very fine-grained.				
							GC		
10				-	SAND: clayey, calcareous, light brown to white, fine- to coarse- grained with gravel.				
15									

 ABB ENVIRONMENTAL SERVICES, INC.

TITLE: NAS Key West, Flying Club	LOG of WELL: KYW-A127-4		BORING NO. SB1
CLIENT: SOUTHNAVFACENGCOM			PROJECT NO: 8508-30
CONTRACTOR: Groundwater Protection, Inc.		DATE STARTED: 10/15/93	COMPLTD: 10/15/93
METHOD: 4.25" HSA	CASE SIZE: 2 inch	SCREEN INT.: 2 - 12 FT.	PROTECTION LEVEL: D
TOC ELEV.: 10.70 FT.	MONITOR INST.: OVA	TOT DPTH: 12FT.	DPTH TO ▽ 3.78 FT.
LOGGED BY: J. Koch	WELL DEVELOPMENT DATE: 10/15/93		SITE: NAS Key West, Flying Club

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				1	SAND: clayey, silty, calcareous, medium brown, fine- to coarse- grained. *No odor.*		SC		
				60	SAND: clayey, silty, calcareous, medium brown, fine- to coarse- grained with gravel.		GC		
5				2500	As above, with coarse gravel. *Slight odor.*				
10					SAND: clayey, calcareous, light brown to white, fine- to coarse- grained with gravel. *No odor.*				
15									

ABB ENVIRONMENTAL SERVICES, INC.

TITLE: NAS Key West, Flying Club	**LOG of WELL:** KYW-A127-5	**BORING NO.** SB17
CLIENT: SOUTHNAVFACENGCOM		**PROJECT NO:** 8508-30
CONTRACTOR: Groundwater Protection, Inc.	**DATE STARTED:** 10/15/93	**COMPLTD:** 10/15/93
METHOD: 4.25" HSA	**CASE SIZE:** 2 inch	**SCREEN INT.:** 2 - 12 FT.	**PROTECTION LEVEL:** D
TOC ELEV.: 10.86 FT.	**MONITOR INST.:** OVA	**TOT DPTH:** 12FT.	**DPTH TO ▽** 3.95 FT.
LOGGED BY: J. Koch	**WELL DEVELOPMENT DATE:** 10/15/93	**SITE:** NAS Key West, Flying Club

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				0	SAND: silty, calcareous, light brown, fine- to coarse-grained. *No odor.*		SM		
				0			SC		
5				0	SAND: silty, clayey, calcareous, light brown, fine- to coarse-grained.				
10					SAND: clayey, calcareous, light brown to white, fine- to coarse- grained.				
15									

ABB ENVIRONMENTAL SERVICES, INC.

TITLE: NAS Key West, Flying Club	LOG of WELL: KYW-A127-6		BORING NO.
CLIENT: SOUTHNAVFACENGCOM			PROJECT NO: 8508-30
CONTRACTOR: Groundwater Protection, Inc.		DATE STARTED: 10/15/93	COMPLTD: 10/15/93
METHOD: 4.25" HSA	CASE SIZE: 2 inch	SCREEN INT.: 2 - 12 FT.	PROTECTION LEVEL: D
TOC ELEV.: 10.69 FT.	MONITOR INST.: OVA	TOT DPTH: 12FT.	DPTH TO ▽ 3.86 FT.
LOGGED BY: J. Koch	WELL DEVELOPMENT DATE: 10/15/93		SITE: NAS Key West, Flying Club

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
					SAND: clayey, calcareous, light brown, fine- to coarse-grained. *Strong petroleum odor.*		SC		
5									
							GC		
10					SAND: clayey calcareous, light brown to gray, fine- to coarse-grained with gravel. *Strong petroleum odor.*				
15									

ABB ENVIRONMENTAL SERVICES, INC.

TITLE: NAS Key West, Flying Club	LOG of WELL: KYW-A127-7		BORING NO.
CLIENT: SOUTHNAVFACENGCOM			PROJECT NO: 8508-30
CONTRACTOR: Groundwater Protection, Inc.		DATE STARTED: 10/15/93	COMPLTD: 10/15/93
METHOD: 4.25" HSA	CASE SIZE: 2 inch	SCREEN INT.: 2 - 12 FT.	PROTECTION LEVEL: D
TOC ELEV.: 10.78 FT.	MONITOR INST.: OVA	TOT DPTH: 12FT.	DPTH TO ▽ 4.06 FT.
LOGGED BY: J. Koch	WELL DEVELOPMENT DATE: 10/15/93		SITE: NAS Key West, Flying Club

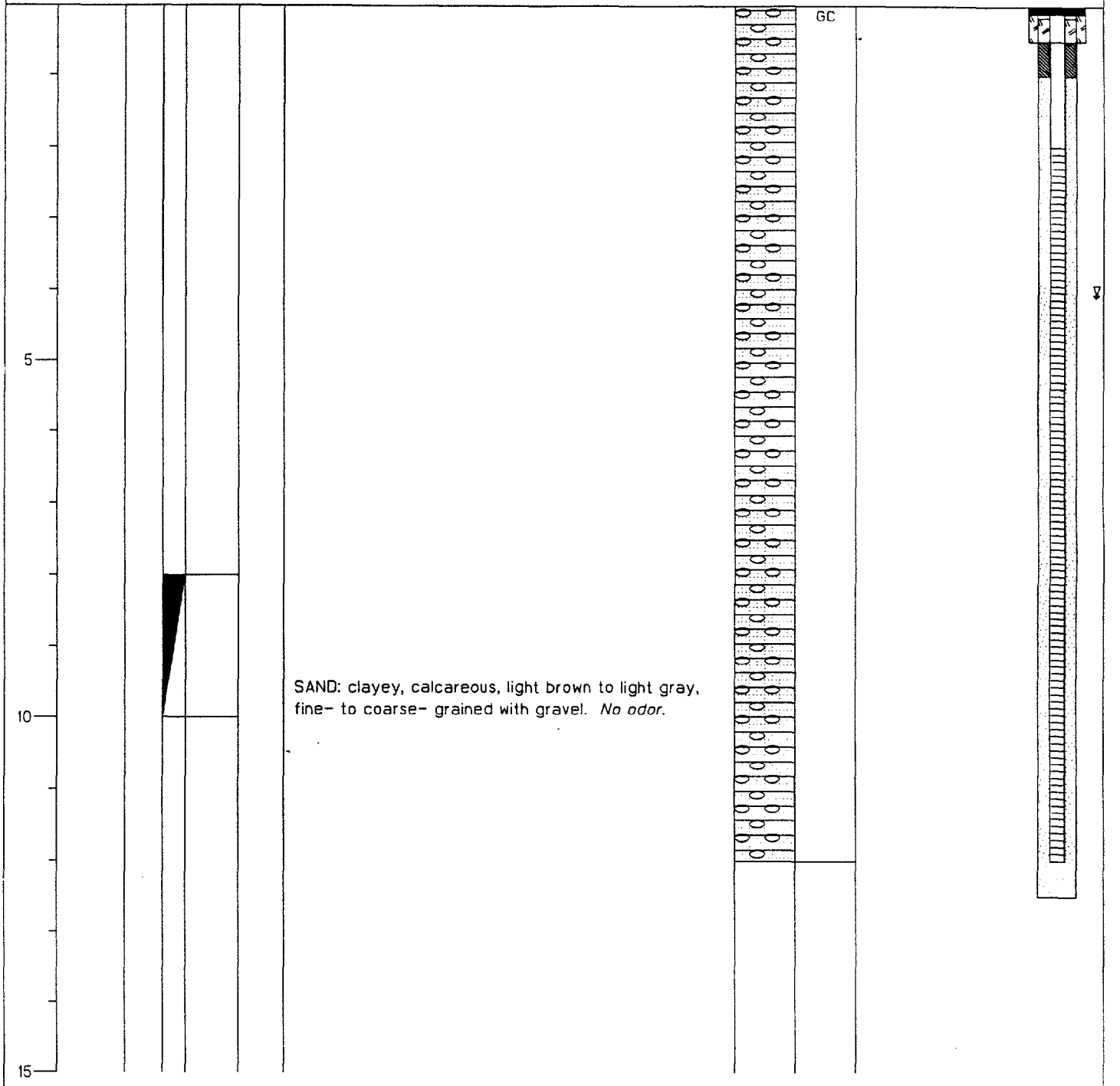


 ABB ENVIRONMENTAL SERVICES, INC.

TITLE: NAS Key West, Flying Club	LOG of WELL: KYW-A127-8		BORING NO. SB44
CLIENT: SOUTHNAVFACENGCOM			PROJECT NO: 8508-30
CONTRACTOR: Groundwater Protection, Inc.		DATE STARTED: 10/15/93	COMPLTD: 10/15/93
METHOD: 4.25" HSA	CASE SIZE: 2 inch	SCREEN INT.: 2 - 12 FT.	PROTECTION LEVEL: D
TOC ELEV.: 10.64 FT.	MONITOR INST.: OVA	TOT DPTH: 12FT.	DPTH TO ▽ 3.98 FT.
LOGGED BY: J. Koch	WELL DEVELOPMENT DATE: 10/15/93		SITE: NAS Key West, Flying Club

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				<1	SAND: clayey, calcareous, light brown to dark brown, fine- to coarse- grained. *No odor.*		SC		
				<1	SAND: clayey, calcareous, light brown to white, fine- to coarse- grained with gravel.		GC		
5				<1	SAND: clayey, calcareous, light brown to light gray, fine- to coarse- grained with gravel.				
10				-	SAND: clayey, calcareous, light brown to medium gray, fine- to coarse- grained with gravel.				
15									

ABB ENVIRONMENTAL SERVICES, INC.

TITLE: NAS Key West, Flying Club	**LOG of WELL:** KYW-A127-9		**BORING NO.** SB41
CLIENT: SOUTHNAVFACENGCOM			**PROJECT NO:** 8508-30
CONTRACTOR: Groundwater Protection, Inc.		**DATE STARTED:** 10/15/93	**COMPLTD:** 10/15/93
METHOD: 4.25" HSA	**CASE SIZE:** 2 inch	**SCREEN INT.:** 2 - 12 FT.	**PROTECTION LEVEL:** D
TOC ELEV.: 10.92 FT.	**MONITOR INST.:** OVA	**TOT DPTH:** 12FT.	**DPTH TO ▽** 4.07 FT.
LOGGED BY: R. Durham, J. Koch	**WELL DEVELOPMENT DATE:** 10/15/93		**SITE:** NAS Key West, Flying Club

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				0	SAND: silty, calcareous, light brown, fine- to medium-grained. *Slight odor.*		SM		
				0			GC		
5				2	SAND: clayey, calcareous, light brown to white, fine- to coarse- grained with gravel. *Strong odor.*				
10					SAND: light brown, silty to coarse-grained with limestone gravel. *No odor.*				
15									

 ABB ENVIRONMENTAL SERVICES, INC.

TITLE: NAS Key West, Flying Club	LOG of WELL: KYW-A127-10	BORING NO.
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: 8508-30

CONTRACTOR: Groundwater Protection, Inc.	DATE STARTED: 10/15/93	COMPLTD: 10/15/93

METHOD: 4.25" HSA	CASE SIZE: 2 inch	SCREEN INT.: 2 - 12 FT.	PROTECTION LEVEL: D
TOC ELEV.: 10.55 FT.	MONITOR INST.: OVA	TOT DPTH: 12FT.	DPTH TO ▽ 3.84 FT.
LOGGED BY: R. Durham	WELL DEVELOPMENT DATE: 10/15/93		SITE: NAS Key West, Flying Club

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				<1	SAND: clayey to coarse-grained, light brown, some limestone gravel. *No odor.*		GC		
				<1					
5					As above. *Slight petroleum odor.*				
10									
15									

ABB ENVIRONMENTAL SERVICES, INC.

TITLE: NAS Key West, Flying Club		LOG of WELL: KYW-A127-11	BORING NO. SB7
CLIENT: SOUTHNAVFACENGCOM			PROJECT NO: 8508-30
CONTRACTOR: Groundwater Protection, Inc.		DATE STARTED: 10/15/93	COMPLTD: 10/15/93
METHOD: 4.25" HSA	CASE SIZE: 2 inch	SCREEN INT.: 2 - 12 FT.	PROTECTION LEVEL: D
TOC ELEV.: 10.00 FT.	MONITOR INST.: OVA	TOT DPTH: 12FT.	DPTH TO ▽ 3.09 FT.
LOGGED BY: J. Koch	WELL DEVELOPMENT DATE: 10/15/93		SITE: NAS Key West, Flying Club

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				0	SAND: clayey, calcareous, light brown to light gray, fine- to medium- grained. *No odor.*		SC		
				0			GC		
5				0	SAND: clayey, calcareous, light brown, fine- to coarse-grained with gravel.				
10					SAND: clayey, calcareous, light brown to white, fine- to coarse- grained with gravel.				
15									

ABB ENVIRONMENTAL SERVICES, INC.

TITLE: NAS Key West, Flying Club	LOG of WELL: KYW-A127-12		BORING NO. N/A
CLIENT: SOUTHNAVFACENGCOM			PROJECT NO: 8508-30
CONTRACTOR: Groundwater Protection, Inc.		DATE STARTED: 10/15/93	COMPLTD: 10/15/93
METHOD: 4.25" HSA	CASE SIZE: 2 inch	SCREEN INT.: 2 - 12 FT.	PROTECTION LEVEL: D
TOC ELEV.: 10.56 FT.	MONITOR INST.: OVA	TOT DPTH: 12FT.	DPTH TO ▽ 3.87 FT.
LOGGED BY: J. Koch	WELL DEVELOPMENT DATE: 10/15/93		SITE: NAS Key West, Flying Club

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				<1	SAND: clayey, calcareous, light brown, fine- to coarse-grained. *No odor.*		SC		
				<1	SAND: clayey calcareous, light brown to white, fine- to coarse- grained.				
5				1					
10									
15									

ABB ENVIRONMENTAL SERVICES, INC.

TITLE: NAS Key West, Flying Club		LOG of WELL: KYW-A127-13	BORING NO. N/A
CLIENT: SOUTHNAVFACENGCOM			PROJECT NO: 8508-30
CONTRACTOR: Groundwater Protection, Inc.		DATE STARTED: 10/16/93	COMPLTD: 10/16/93
METHOD: 4.25" HSA	CASE SIZE: 2 inch	SCREEN INT.: 2 - 12 FT.	PROTECTION LEVEL: D
TOC ELEV.: 10.44 FT.	MONITOR INST.: OVA	TOT DPTH: 12FT.	DPTH TO ▽ 3.50 FT.
LOGGED BY: J. Williams	WELL DEVELOPMENT DATE: 10/16/93		SITE: NAS Key West, Flying Club

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				0	SAND: clayey, calcareous, white to light brown, coarse- to fine- grained.		SC		
				0					
5				0					
10				-					
15									

ABB ENVIRONMENTAL SERVICES, INC.

TITLE: NAS Key West, Flying Club	LOG of WELL: KYW-A127-14D		BORING NO. SB10
CLIENT: SOUTHNAVFACENGCOM			PROJECT NO: 8508-30
CONTRACTOR: Groundwater Protection, Inc.		DATE STARTED: 10/16/93	COMPLTD: 10/16/93
METHOD: 4.25" HSA	CASE SIZE: 2 inch	SCREEN INT.: 25 - 30 FT.	PROTECTION LEVEL: D
TOC ELEV.: FT.	MONITOR INST.: OVA	TOT DPTH: 30FT.	DPTH TO ▽ 4.13 FT.
LOGGED BY: J. Williams	WELL DEVELOPMENT DATE: 10/17/93		SITE: NAS Key West, Flying Club

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				0	SAND: calcareous, some silt, some clay, medium brown to light brown, fine- to coarse-grained. *Slight odor.*		GC		
				0	SAND: calcareous, some clay, light brown, white, gray, fine- to coarse-grained with gravel, wet at 4' bls. *Slight odor.*				
5				250	SAND: calcareous, some clay, light brown, white, gray, fine- to coarse-grained with gravel, saturated. *Strong odor.*				
10									
15			12/24	45	ORGANICS: 15-15.3 bls, dark brown to black. SAND: 15.3-15.5 bls, calcareous, gray, fine- to medium-grained, 25-30% silt and clay. LIMESTONE: 15.5-17 bls, white, highly weathered.		OL LS	31/30/77/80	
20			22/24	210	LIMESTONE: highly weathered, white. *Slight odor.*			30/37/45/50	
25			24/24	32	LIMESTONE: highly weathered, white.			5/8/13/12	
30			20/24	11	LIMESTONE: white, unconsolidated, well graded gravel to fine sand fragments, little silt/clay, trace phosphorous, trace quartz sand, coarse- to medium-grained, angular to sub-angular.			2/2/7/8	
35									

 ABB ENVIRONMENTAL SERVICES, INC.

TITLE: NAS Key West, Flying Club	LOG of WELL: KYW-A127-15D		BORING NO. SB48
CLIENT: SOUTHNAVFACENGCOM			PROJECT NO: 8508-30
CONTRACTOR: Groundwater Protection, Inc.		DATE STARTED: 10/16/93	COMPLTD: 10/16/93
METHOD: 4.25" HSA	CASE SIZE: 2 inch	SCREEN INT.: 20 - 25 FT.	PROTECTION LEVEL: D
TOC ELEV.: FT.	MONITOR INST.: OVA	TOT DPTH: 25FT.	DPTH TO ▽ 4.03 FT.
LOGGED BY: J. Williams	WELL DEVELOPMENT DATE: 10/17/93		SITE: NAS Key West, Flying Club

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				1	SAND: calcareous, some silt, some clay, medium brown to light gray, fine- to coarse-grained. *No odor.*		GC		
				1	SAND: calcareous, some clay, light brown, white, gray, fine- to coarse-grained with gravel. *No odor.*				
5				2200	SAND: calcareous, some clay, light brown, white, gray, fine- to coarse-grained with pebbles, saturated. *Strong odor.*				
10									
							LS		
15			18/24	22	LIMESTONE: highly weathered, white. *Odor.*			13/33/47/40	
20			20/24	3	LIMESTONE: highly weathered, white. *Slight odor.*			18/23/>100/	
25									
30									
35									

TITLE: NAS Key West, Flying Club	LOG of WELL: KYW-A127-16	BORING NO. SB27
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: 8508-30
CONTRACTOR: Groundwater Protection, Inc.	DATE STARTED: 10/16/93	COMPLTD: 10/16/93
METHOD: 4.25" HSA	CASE SIZE: 2 inch	SCREEN INT.: 2 - 12 FT.	PROTECTION LEVEL: D
TOC ELEV.: 10.84 FT.	MONITOR INST.: OVA	TOT DPTH: 12FT.	DPTH TO ▽ 3.91 FT.
LOGGED BY: R. Durham, J. Koch	WELL DEVELOPMENT DATE: 10/16/93	SITE: NAS Key West, Flying Club

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				<1	SAND: fine-grained to clayey, light brown, some dark gray fine-grained sand. *Faint odor.*		SC		
				<1	SAND: very fine- to medium-grained, some limestone gravel, light brown. *No odor.*		GC		
5				<1	SAND: very fine-grained to silty, some limestone gravel, light brown.				
10					SAND: clayey, calcareous, some gravel, light brown to white, fine- to coarse-grained.				
15									

ABB ENVIRONMENTAL SERVICES, INC.

TITLE: NAS Key West, Flying Club	LOG of WELL: KYW-A127-17		BORING NO. N/A
CLIENT: SOUTHNAVFACENGCOM			PROJECT NO: 8508-30
CONTRACTOR: Groundwater Protection, Inc.		DATE STARTED: 10/16/93	COMPLTD: 10/16/93
METHOD: 4.25" HSA	CASE SIZE: 2 inch	SCREEN INT.: 2 - 12 FT.	PROTECTION LEVEL: D
TOC ELEV.: 11.00 FT.	MONITOR INST.: OVA	TOT DPTH: 12FT.	DPTH TO ▽ 4.09 FT.
LOGGED BY: J. Koch	WELL DEVELOPMENT DATE: 10/16/93		SITE: NAS Key West, Flying Club

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				<1	SAND: clayey, calcareous, light brown to dark brown, fine- to coarse- grained. *Petroleum odor.*		SC		
				<1			GC		
5				3300	SAND: clayey calcareous, some gravel, light brown to white, fine- to coarse-grained. *Strong petroleum odor.*				
10									
15									

ABB ENVIRONMENTAL SERVICES, INC.

TITLE: NAS Key West, Flying Club	LOG of WELL: KYW-A127-18		BORING NO. N/A
CLIENT: SOUTHNAVFACENGCOM			PROJECT NO: 8508-30
CONTRACTOR: Groundwater Protection, Inc.		DATE STARTED: 10/16/93	COMPLTD: 10/16/93
METHOD: 4.25" HSA	CASE SIZE: 2 inch	SCREEN INT.: 2 - 12 FT.	PROTECTION LEVEL: D
TOC ELEV.: 10.91 FT.	MONITOR INST.: OVA	TOT DPTH: 12FT.	DPTH TO ▽ 4.09 FT.
LOGGED BY: J. Koch	WELL DEVELOPMENT DATE: 10/16/93		SITE: NAS Key West, Flying Club

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				<1	SAND: clayey, calcareous, light brown to dark brown, fine- to coarse- grained. *No odor.*		SC		
				<1	SAND: clayey, calcareous, light brown to light gray, fine- to coarse- grained with gravel.		GC		
5				>500	As above. *Slight petroleum odor.*				▽
10				-					
15									

TITLE: NAS Key West, Flying Club		LOG of WELL: KYW-A127-19	BORING NO. N/A
CLIENT: SOUTHNAVFACENGCOM			PROJECT NO: 8508-30
CONTRACTOR: Groundwater Protection, Inc.		DATE STARTED: 10/16/93	COMPLTD: 10/16/93
METHOD: 4.25" HSA	CASE SIZE: 2 inch	SCREEN INT.: 2 - 12 FT.	PROTECTION LEVEL: D
TOC ELEV.: 10.44 FT.	MONITOR INST.: OVA	TOT DPTH: 12FT.	DPTH TO ▽ 3.74 FT.
LOGGED BY: J. Koch	WELL DEVELOPMENT DATE: 10/16/93		SITE: NAS Key West, Flying Club

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				25	SAND: silty, calcareous, dark brown to black, fine- to coarse-grained. *Petroleum odor.*		SM		
				90	SAND: silty, clayey, calcareous, dark brown, fine- to coarse-grained. *Petroleum odor.*		LS		
5				370	LIMESTONE: light brown to dark brown, some silt. *Strong petroleum odor.*				
10									
15									

ABB ENVIRONMENTAL SERVICES, INC.

TITLE: NAS Key West, Flying Club	LOG of WELL: KYW-A127-20		BORING NO. N/A
CLIENT: SOUTHNAVFACENGCOM			PROJECT NO: 8508-30
CONTRACTOR: Groundwater Protection, Inc.		DATE STARTED: 10/16/93	COMPLTD: 10/16/93
METHOD: 4.25" HSA	CASE SIZE: 2 inch	SCREEN INT.: 2 - 12 FT.	PROTECTION LEVEL: D
TOC ELEV.: 10.35 FT.	MONITOR INST.: OVA	TOT DPTH: 12FT.	DPTH TO ▽ 3.52 FT.
LOGGED BY: J. Koch	WELL DEVELOPMENT DATE: 10/16/93		SITE: NAS Key West, Flying Club

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				0	SAND: clayey, calcareous sand, light brown to white, fine- to coarse- grained. *No odor.*		SC		
				9	SAND: clayey, calcareous, light brown to white, fine- to coarse grained with gravel. *Slight petroleum odor.*		GC		
5				2900	As above. *Strong petroleum odor.*				
10									
15									

APPENDIX C

TIDAL INFLUENCE STUDY

TIDAL INFLUENCE STUDY

Background. The tide is the periodic rise and fall of the earth's water resulting from gravitational interactions between the sun, moon, and earth. There are generally two high and two low waters in a day. Tides follow the Moon more closely than they do the sun, and the lunar or tidal day is about 50 minutes longer than the solar day. When the two high waters and two low waters of each tidal day are approximately equal in height, the tide is said to be semidiurnal. When there is a relatively large diurnal inequality in the high or low waters or both, the tide is said to be mixed. Finally, when there is only one high water and one low water in each tidal day, the tide is said to be diurnal. When water is falling or moving away from a shoreline, the tide is said to be an ebb tide. Under the conditions when water is rising the tide is said to be a flood tide. The time and heights of the rising and falling of the tide can be predicted based on our knowledge of these gravitational interactions. Daily tide predictions in the United States are available and are based upon analyses of tidal observations for periods of at least 1 year. Extreme meteorological conditions are excluded from the analyses and predictions, therefore, the predicted tidal heights are those expected under average weather conditions. Prolonged onshore winds or a low barometric pressure can produce higher tidal levels than predicted. In addition, prolonged offshore winds or a high barometric pressure can produce lower tidal levels than predicted.

Variations in the coastline and in the coastal bathymetry (channels, shoals, etc.) can also make a difference in the times that the tidal wave hits different points along the same coastline.

Exclusive of weather conditions, the astronomical tide is also subject to range variations. Decreased ranges may be expected near the times when the moon is in apogee (farthest from the earth) or in quadrature (angular separation of the moon and sun from the earth is 90 degrees; also called neap tides). Increased ranges may be expected when the moon is in perigee (nearest to earth in its orbit) or in a new or full position (spring tides). A larger diurnal range may also result when the moon is in its maximum declination (tropic tides). The actual tidal range will depend upon the extent to which combinations of these positions reinforce or detract from one another. These range variations based on astronomical conditions are included in the daily tide predictions. Daily predicted tide tables for the coastal United States are published by the U.S. Department of Commerce, National Oceanic and Atmospheric Administration. The tide tables predict the high and low water heights based on Mean Lower Low Water (MLLW) datum and times based on a referred meridian. The tidal datum MLLW is an arithmetic mean of the lower low water heights of a mixed tide observed over a specific 19-year Metonic cycle (the national Tidal Datum Epoch). Only the lower low water of each pair of low waters, or the only low water of a tidal day is included in the mean.

Groundwater aquifers that are in hydraulic connection with surface water bodies such as rivers, lakes, oceans, etc., are influenced by fluctuations of the water bodies. These fluctuations may be the result of tidal influences, flooding, rainfall, or the influence of man made control structures such as dams and locks. During high surface water conditions the aquifer may be recharged, whereas, during low surface water conditions the aquifer will usually discharge into the

surface water body. In a groundwater aquifer, the effects of surface water fluctuations will diminish with distance from the source (river, ocean, etc.).

NAS Key West is located on Boca Chica Key. The Lower Keys, including Boca Chica Key, are overlain by an oolitic member of the Pleistocene Miami Limestone, except in those areas where fill material has been imported. The surficial aquifer is contained within this oolitic member. Groundwater at NAS Key West on Boca Chica Key is encountered from 1 to 5 feet bls. Because of the high hydraulic conductivity of this oolite, the groundwater on the entire Key is suspected of experiencing tidal fluctuations, particularly at near extreme high and low tide conditions.

Tidal Study Methodologies. The tidal study was conducted at the Flying Club site from 1800 hours on November 30, 1993 to 0730 hours on December 2, 1993. Initially, water levels were collected from a temporary surface water gauge located at the Jet Engine Test Cell and from monitoring wells MW-8, MW-6, and MW-4. During the study, water levels were recorded from these stations every 15 minutes using a Hermit™ Data Logger and pressure transducer probes.

The monitoring well stations were surveyed to a reference benchmark located at MW-11 that has an arbitrarily assigned elevation of 10.00 feet.

The water level data from the monitoring wells were then compared to the predicted tide levels in the Key West area.

Tidal Study Results. The study period was scheduled to take place within 3 days of a full Moon (November 29, 1993) so that near maximum water level fluctuations, as a result of the tide, could be observed. The actual study was conducted from 1645 hours on November 30, 1993, to 0700 hours on December 2, 1993. Comparisons of the water level fluctuations in the monitoring wells to the predicted tide levels in the Key West area indicated that local bathymetry and the location of the site (convergence of the Atlantic Ocean and the Gulf of Mexico) greatly impact the arrival time and levels of the tides in the area.

Predicted tide arrivals and levels at the Key West station, located at Truman Annex on the west side of Key West, are compared to the Boca Chica Channel Bridge station, located approximately 6.5 miles east of the Key West station. These data show the tide occurs 1.5 hours later at the Boca Chica Channel Bridge and has an approximate 60 percent reduction in tidal levels. The Key West station is located approximately 8.5 miles west of the study site, whereas the Boca Chica Channel Bridge station is only 2 miles west of the study site. For tidal stations closer to the study site, the delay in the predicted tide arrivals and levels are even more pronounced. Data from these stations are compared to the Flying Club site and are presented in Table C-1.

The closest predicted tide station to the study site (Rockland Key Channel Bridge) was used in comparing the monitoring well data to the predicted tides. The information in Table C-1 shows the high and low tides at Rockland Key occur between 5 and 6 hours after they occur at the western end of Key West. The variation in water levels during high and low tides is 0.76 to 0.88 times those of Key West. The comparison of the tidal fluctuations with time between the Rockland Key and the Key West stations is presented on Figure C-1. A comparison of the groundwater level fluctuations at the Flying Club site to the tidal fluctuations at Rockland Key is presented on Figure C-2.

Table C-1
Tidal Influence Study
Tidal Differences Between Stations in the Key West Area

Contamination Assessment Report
Flying Club Site, Building A-127
Naval Air Station Key West
Boca Chica Field, Key West, Florida

Place	Differences						Distance from Flying Club Site
	High Water		Low Water		High Water[1]	Low Water[1]	
	h	m	h	m	feet	feet	
Key West, Truman Annex	0	0	0	0	1.0	1.0	8.5 miles W.
Boca Chica Channel Bridge	+1	23	+1	29	0.57	0.67	2 miles W.
Boca Chica Key, Long Point	+3	54	+5	22	0.94	0.71	2 miles NW
Rockland Key, Rockland Channel Bridge	+5	02	+6	06	0.76	0.88	1 mile NE

[1] The water level values of the Key West station for high or low water must be multiplied by this number to obtain the correct tidal levels for the station.

Notes: h = hour.
m = minute.
W = west.
NW = northwest.
NE = northeast.

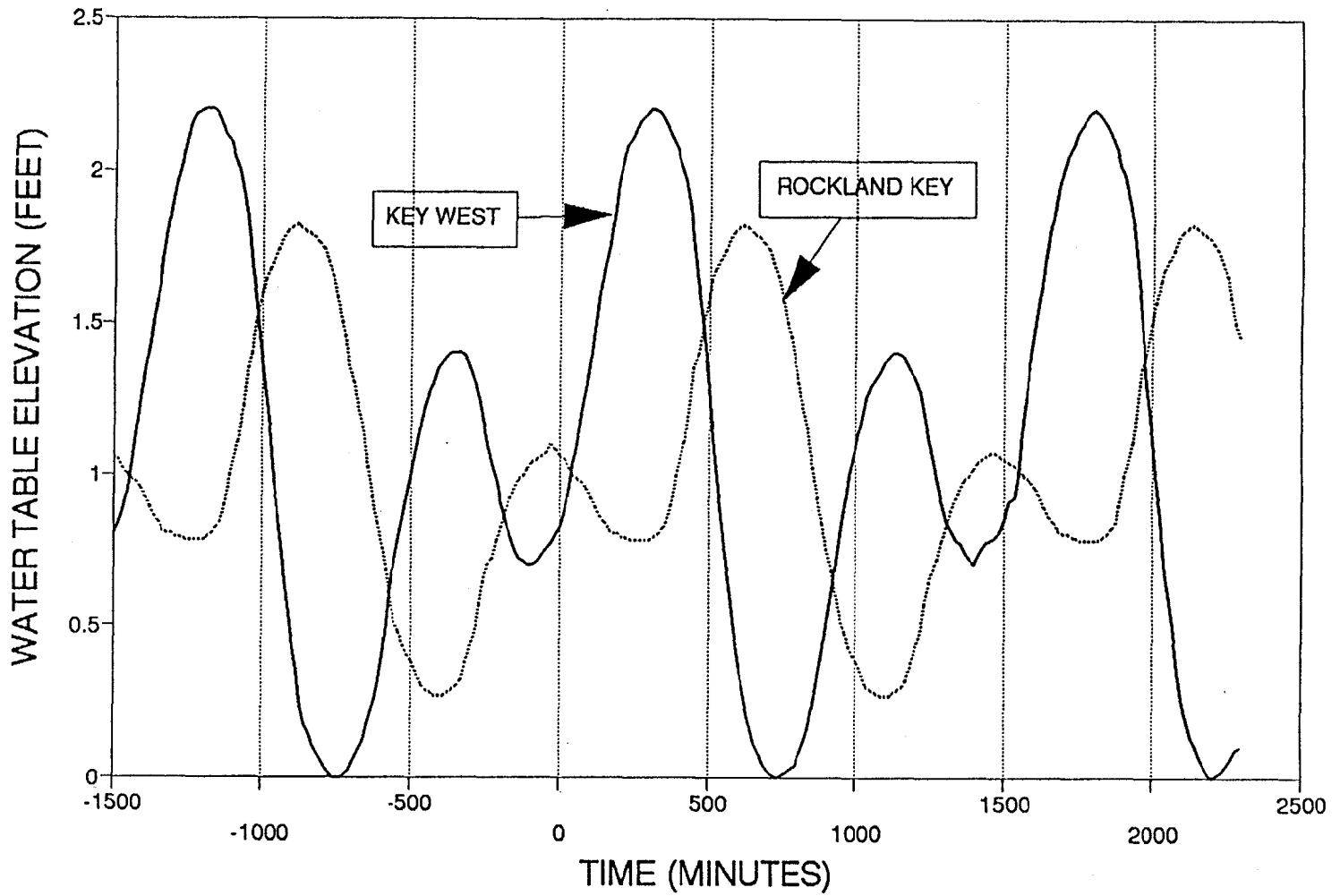
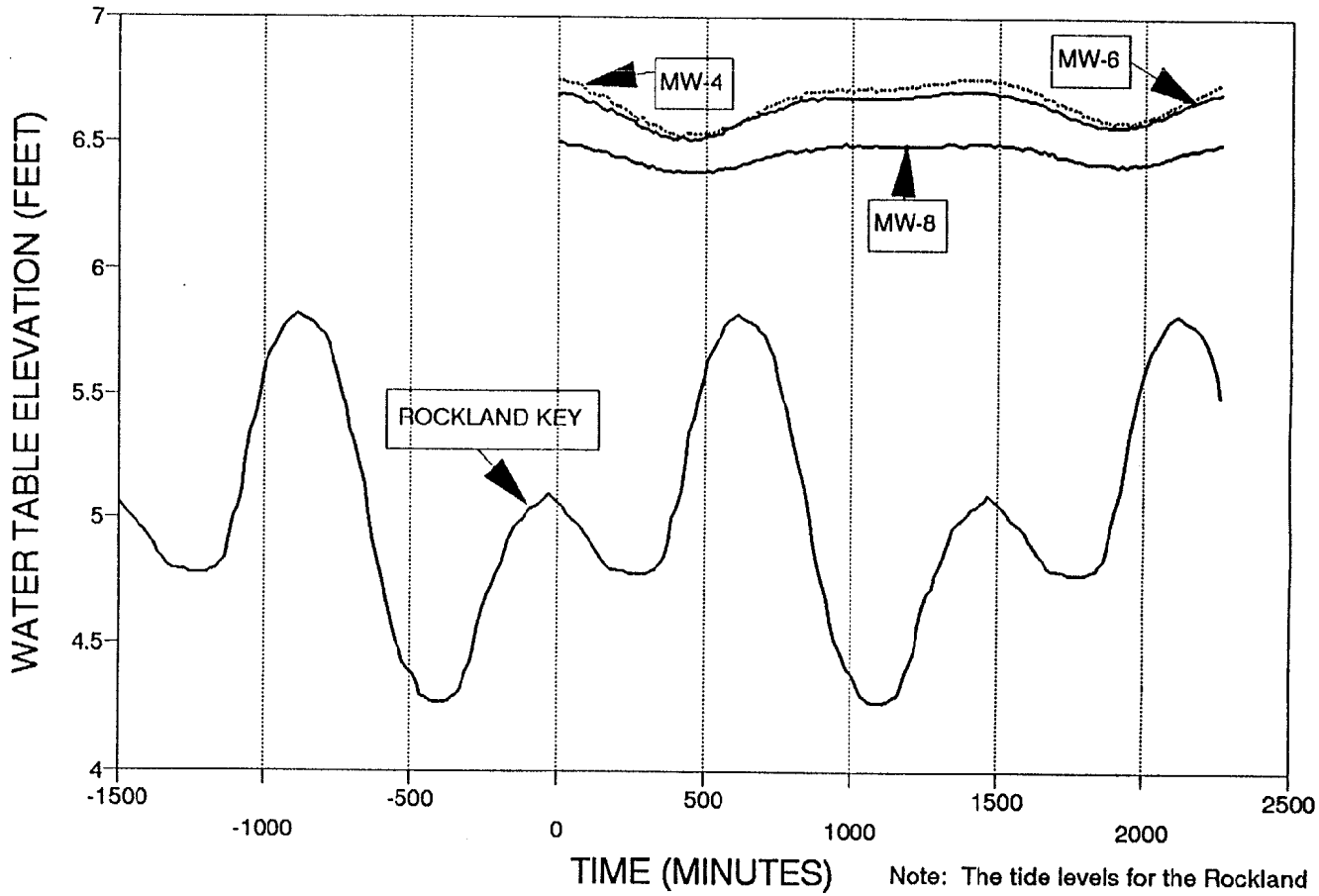


FIGURE C-1
TIDAL INFLUENCE STUDY
PREDICTED AREA TIDAL FLUCTUATIONS

CONTAMINATION ASSESSMENT REPORT
FLYING CLUB SITE,
BUILDING A-127
NAS KEY WEST,
KEY WEST, FLORIDA

8509-40 940131WEM



Note: The tide levels for the Rockland Key station have been increased by 4 feet for graphic purposes.

FIGURE C-2
TIDAL INFLUENCE STUDY
FLYING CLUB SITE

CONTAMINATION ASSESSMENT REPORT
FLYING CLUB SITE, BUILDING A-127

NAS KEY WEST,
KEY WEST, FLORIDA

8509-40 940131WEM

Figure C-2 shows maximum water level fluctuations at the site of approximately 0.22 foot in MW-4, 0.2 foot in MW-6, and 0.12 foot in MW-8.

With the groundwater fluctuations at the site showing a tidal pattern and because the site is located in the central section of Boca Chica Key, it can be inferred that all groundwater at Boca Chica Key is influenced by the tide, especially during extreme tidal events.

Although there is a fluctuation of approximately 0.2 foot in the groundwater at the site caused by the tide that will result in a temporary change in the water table gradient, these fluctuations are not expected to cause any noticeable horizontal migration of the contaminant plume. The duration of these fluctuations and their resulting gradient changes in relationship to the hydraulic conductivity of the material at the site does not suggest any significant lateral movement of water at the site. The vertical movement of the groundwater as a result of tidal fluctuations will cause a spreading of contamination in the soil directly above and below the groundwater table. However, this would be expected anyway as a result of contaminant volatilization and dissolved component migration.

APPENDIX D

AQUIFER PARAMETER CALCULATIONS

Aquifer Parameter Calculations

Hydraulic gradient

Water table elevations were plotted on a map of the site. A water table contour map was drawn with flow lines (depicting groundwater flow direction) perpendicular to the groundwater elevation contours. The groundwater hydraulic gradient was calculated by subtracting the differences in groundwater elevation (in feet) between two points on the map and dividing the elevation difference by the distance between the two points to obtain a resulting gradient in feet per foot (ft/ft). Water elevation data collected on October 18 and December 4, 1993, were used to calculate hydraulic gradients at the site. For each date, three traverses were made perpendicular to equipotential contour lines to calculate an average site hydraulic gradient. For each traverse, the hydraulic gradient was calculated as follows:

$$i = (h_1 - h_2) / d \qquad (1)$$

where

i = hydraulic gradient (ft/ft),
h_1 = water table elevation, upgradient (feet),
h_2 = water table elevation, downgradient (feet), and
d = horizontal distance (feet) between h_1 and h_2 along a flow line.

Hydraulic gradients calculated in this manner varied from 1.04×10^{-3} ft/ft to 2.04×10^{-3} ft/ft. The average hydraulic gradient at the site was calculated to be 1.52×10^{-3} ft/ft.

Hydraulic conductivity

Hydraulic conductivity (K) from slug test data was calculated following the methods of Bouwer and Rice (1976) and Bouwer (1989) for partially penetrating wells screened in unconfined aquifers. The following well information was needed to assess the hydraulic conductivity:

- radius of well casing (r_c),
- r_w = radius of borehole (r_c plus radius of the sand pack surrounding the well screen),
- length of screened interval below the water table (L_e),
- effective well radius (r_e),
- depth of well below the water table (L_w),
- depth to confining unit or bottom of aquifer below the static water table (H), and
- plot of time versus the logarithm of y, where y is the difference between the static water level outside the well and the water level inside the well.

Figure D-1 is a well diagram depicting most of the aquifer and well parameters. Calculations were made assuming that $L_w < H$. K was calculated as follows:

$$K = [R_c^2 \ln(\frac{r_e}{r_w}) - 2L_e] \ [\frac{1}{t} \ln(\frac{y_o}{y_t})] \quad (2)$$

where

y_0 = y at time zero, and
y_t = y at time t.

The effective well radius, r_e, and the term $[(1/t)\ln(y_0/y_t)]$ were derived by using the computer program AQTESOLV™ (Geraghty & Miller, Inc., 1989). This computer program follows procedures and assumptions outlined by Bouwer (1989).

Slug test graphs are attached at the end of this appendix. Values of y were calculated for a particular time, t, and plotted on the graph. The computer program selects a "best-fit" line through the data points by linear regression along a "straight-line" portion of the graph. The slope of the "best-fit" line is used to calculate the hydraulic conductivity, K.

Three slug tests each were performed inside monitoring wells MW-4 and MW-6. K is reported in feet per minute (ft/min) on the slug test graphs, and was recalculated to feet per day (ft/day). K was found to vary from $4.3x10^{-1}$ ft/day to 1.36 ft/day with an average K of $9.5x10^{-1}$ ft/day.

Average pore water velocity

Estimates of average pore water velocity were obtained using the following formula:

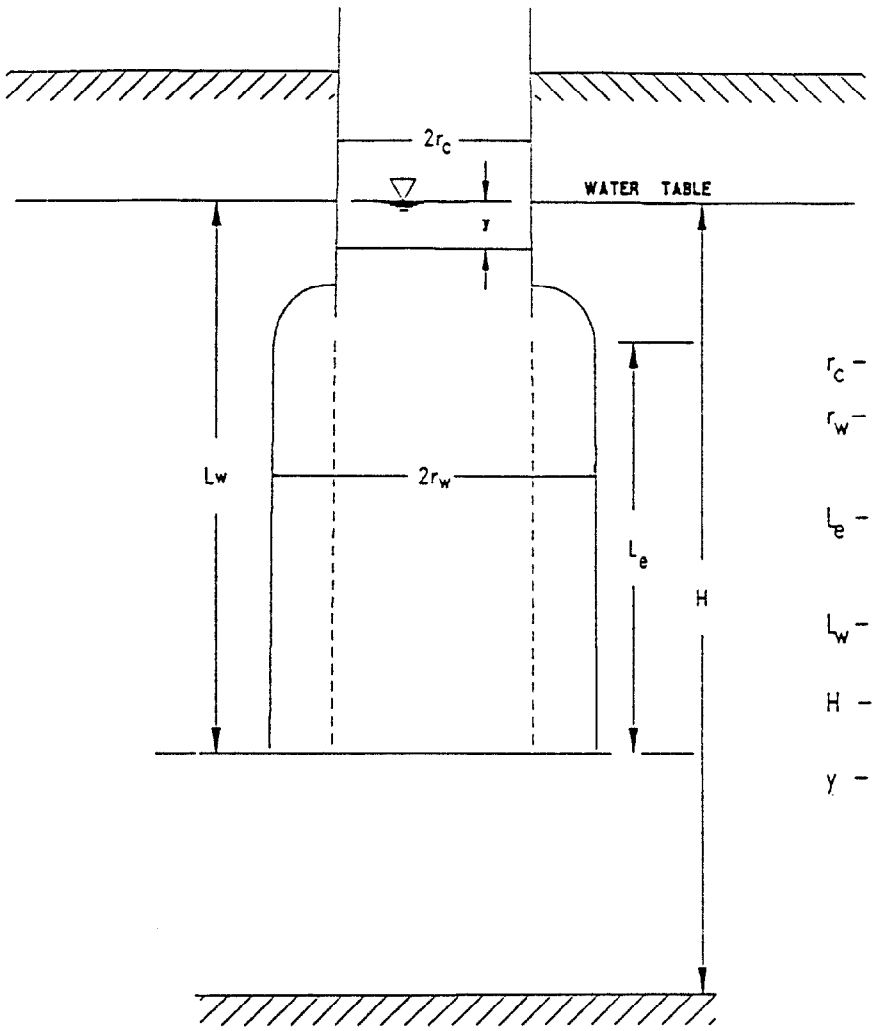
$$V = (K*I)/n \quad (3)$$

where

V = seepage velocity in ft/day,
K = hydraulic conductivity in ft/day,
i = hydraulic gradient, and
n = estimated porosity.

Assuming an estimated porosity of 30% for weathered to oolitic limestone (Davis and Dewiest, 1966), an average hydraulic gradient of $1.52x10^{-3}$ ft/ft, and an average hydraulic conductivity of $9.4x10^{-1}$ ft/day, the average pore water velocity is calculated as follows:

$V = (9.4x10^{-1}$ ft/day * $1.52x10^{-3}$ ft/ft)/ 0.30
$V = 4.8x10^{-3}$ ft/day



r_c – Radius of well

r_w – Radius of well + total thickness of the sand/gravel pack

L_e – Length of screened interval below the water table

L_w – Depth of well below water table

H – Depth to confining unit below the water table

y – Difference between static water level outside well and water level inside well

FIGURE D-1
DEFINITIONS OF SLUG TEST PARAMETERS (From Bouwer, 1989)

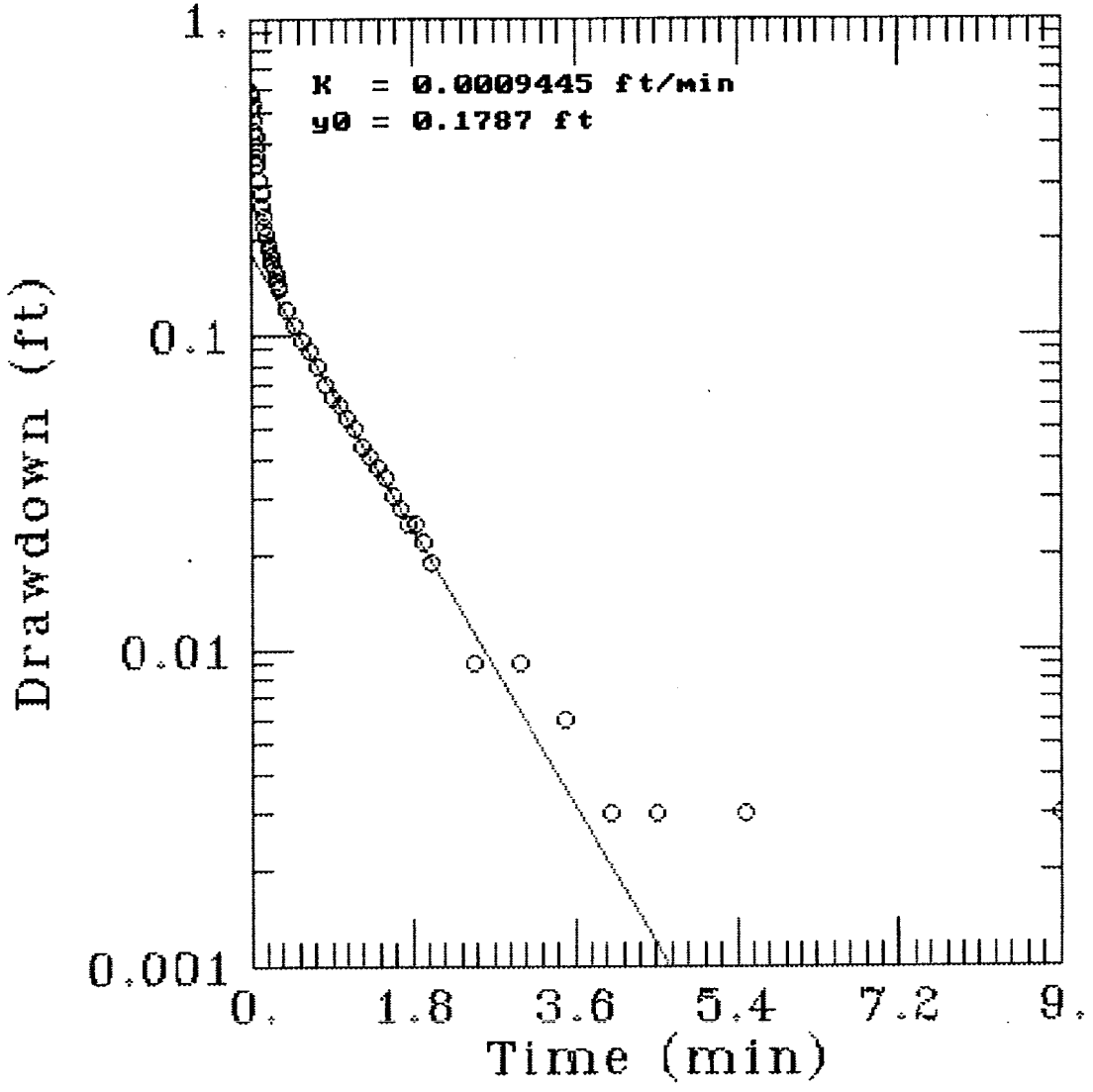
CONTAMINATION ASSESSMENT REPORT
FLYING CLUB SITE,
BUILDING A-127
NAS KEY WEST,
KEY WEST, FLORIDA

8509-40 940131WEM

FlyClub.CAR
FGB.01.94

SLUG TEST GRAPHS

KYW-127-MW4 RUN#1



AQTESOLV

GERAGHTY & MILLER, INC.

Modeling Group

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                          A Q T E S O L V    R E S U L T S
                                   Version  1.10

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==============================================================================
                                 TEST DESCRIPTION

Data set........... A:127MW4R1.set
Data set title..... KYW-127-MW4 RUN#1

Knowns and Constants:
   No. of data points.................. 52
   Radius of well casing............... 0.083
   Radius of well...................... 0.334
   Aquifer saturated thickness......... 8.42
   Well screen length.................. 10
   Static height of water in well...... 8.42
   Log(Re/Rw).......................... 2.46
   A, B, C.............................  0.000,  0.000,  1.967

==============================================================================
                                  ANALYTICAL METHOD

Bouwer-Rice (Unconfined Aquifer Slug Test)

==============================================================================
                      RESULTS FROM STATISTICAL CURVE MATCHING


STATISTICAL MATCH PARAMETER ESTIMATES

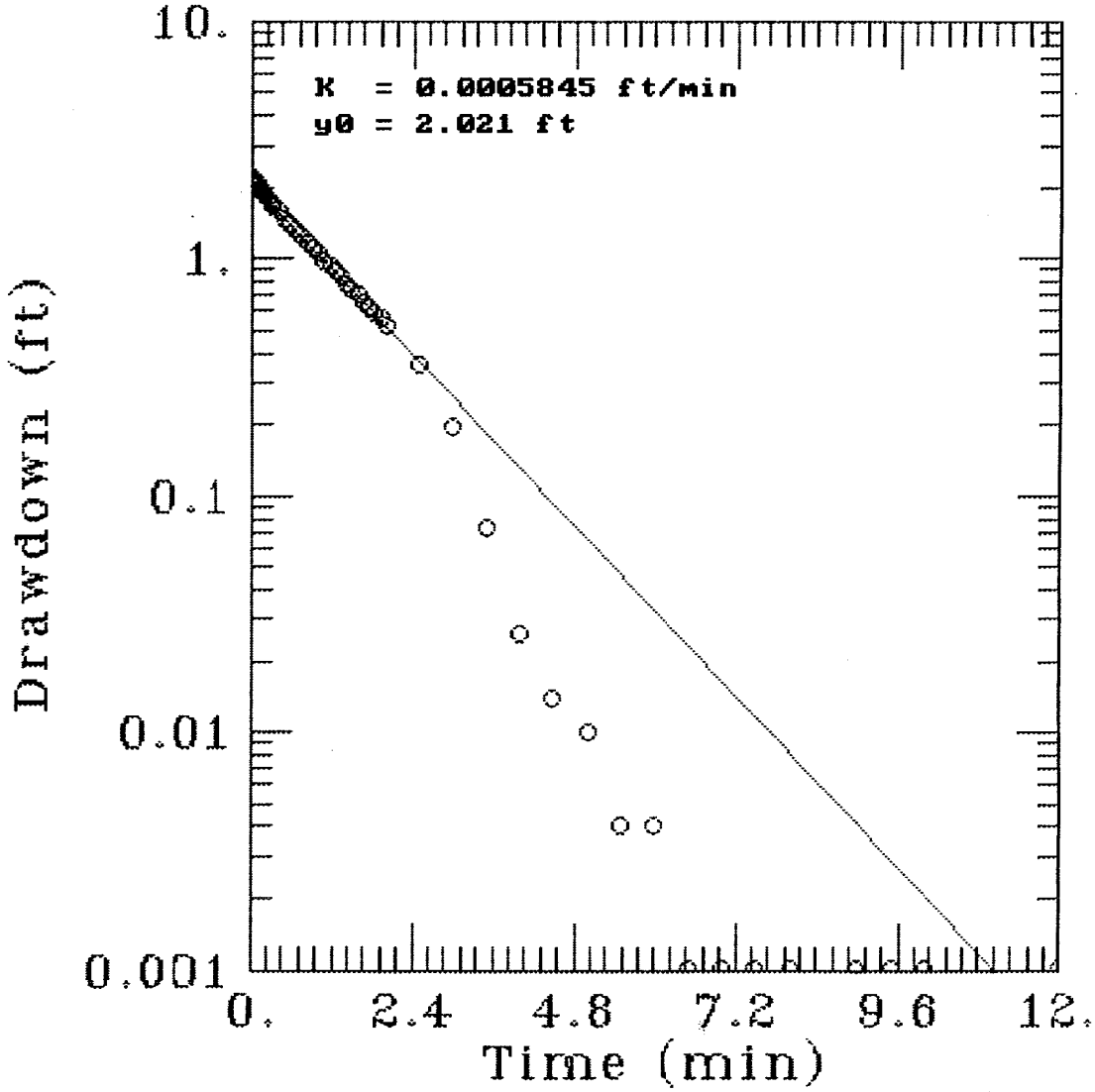
           Estimate         Std. Error
   K  =   4.1886E-003 +/-   2.5288E-004
   y0 =   5.7347E-001 +/-   1.7655E-002


ANALYSIS OF MODEL RESIDUALS

residual = calculated - observed
weighted residual = residual * weight

Weighted Residual Statistics:
   Number of residuals............... 52
   Number of estimated parameters.... 2
   Degrees of freedom................ 50
   Residual mean..................... 0.01597
   Residual standard deviation....... 0.03629
```

KYW-127-MW4 RUN#2



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TEST DESCRIPTION

Data set........... A:127MW4R2.SET
Data set title..... KYW-127-MW4 RUN#2

Knowns and Constants:
No. of data points.................. 61
Radius of well casing............... 0.083
Radius of well...................... 0.334
Aquifer saturated thickness......... 8.42
Well screen length.................. 10
Static height of water in well...... 8.42
Log(Re/Rw).......................... 2.46
A, B, C............................. 0.000, 0.000, 1.967

==

ANALYTICAL METHOD

Bouwer-Rice (Unconfined Aquifer Slug Test)

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RESULTS FROM VISUAL CURVE MATCHING

VISUAL MATCH PARAMETER ESTIMATES

	Estimate
K =	7.4795E-004
y0 =	2.1809E+000

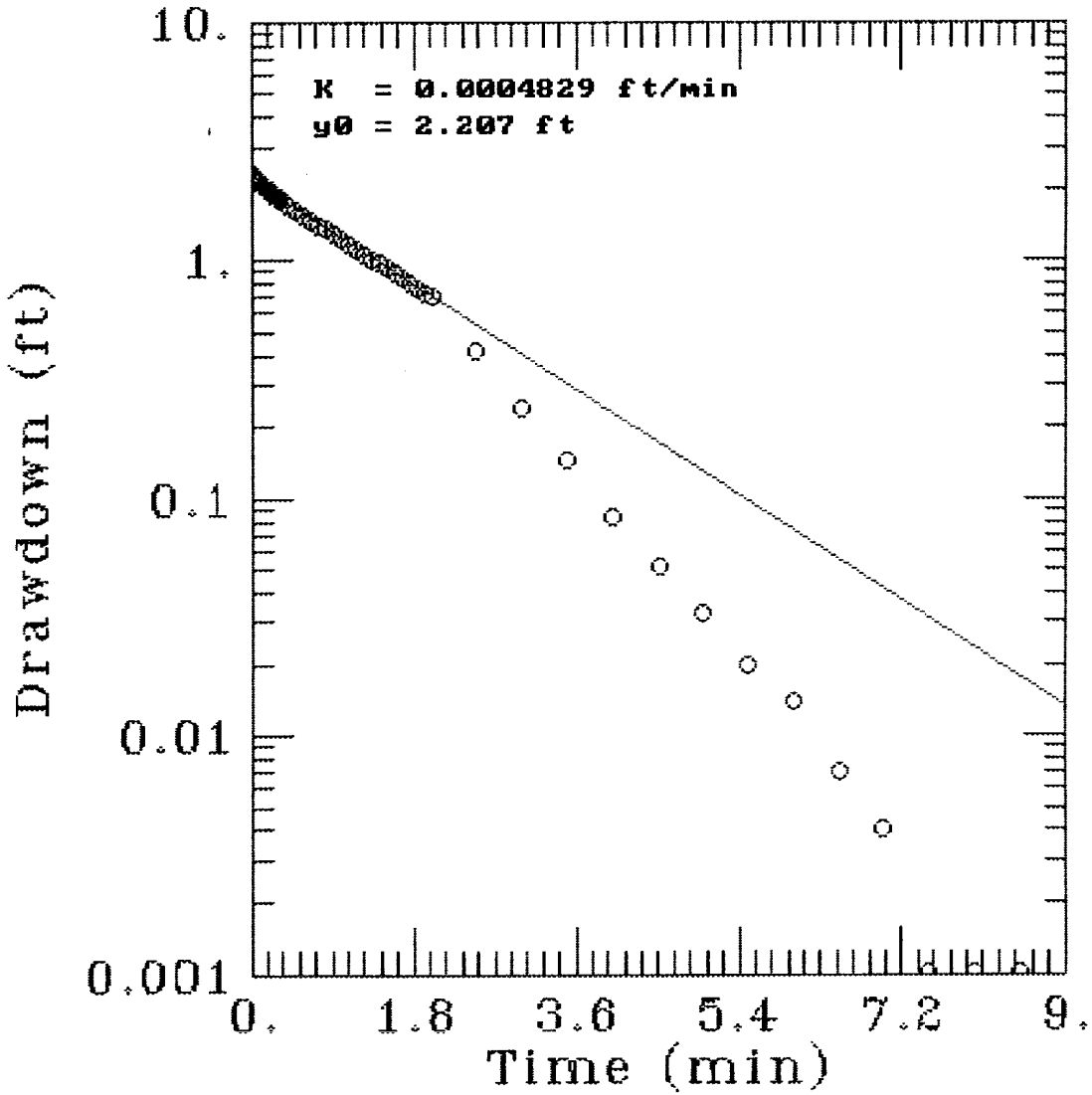
<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<>>

TYPE CURVE DATA

K = 5.84489E-004
y0 = 2.02064E+000

Time	Drawdown	Time	Drawdown	Time	Drawdown
0.000E+000	2.021E+000	1.200E+001	5.132E-004		

KYW-127-MW4 RUN#3



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TEST DESCRIPTION

Data set........... A:127MW4R3.SET
Data set title..... KYW-127-MW4 RUN#3

Knowns and Constants:

- No. of data points.................. 58
- Radius of well casing............... 0.083
- Radius of well...................... 0.334
- Aquifer saturated thickness......... 8.42
- Well screen length.................. 10
- Static height of water in well...... 8.42
- Log(Re/Rw).......................... 2.46
- A, B, C............................. 0.000, 0.000, 1.967

ANALYTICAL METHOD

Bouwer-Rice (Unconfined Aquifer Slug Test)

RESULTS FROM VISUAL CURVE MATCHING

VISUAL MATCH PARAMETER ESTIMATES

	Estimate
K =	7.8092E-004
y0 =	2.1809E+000

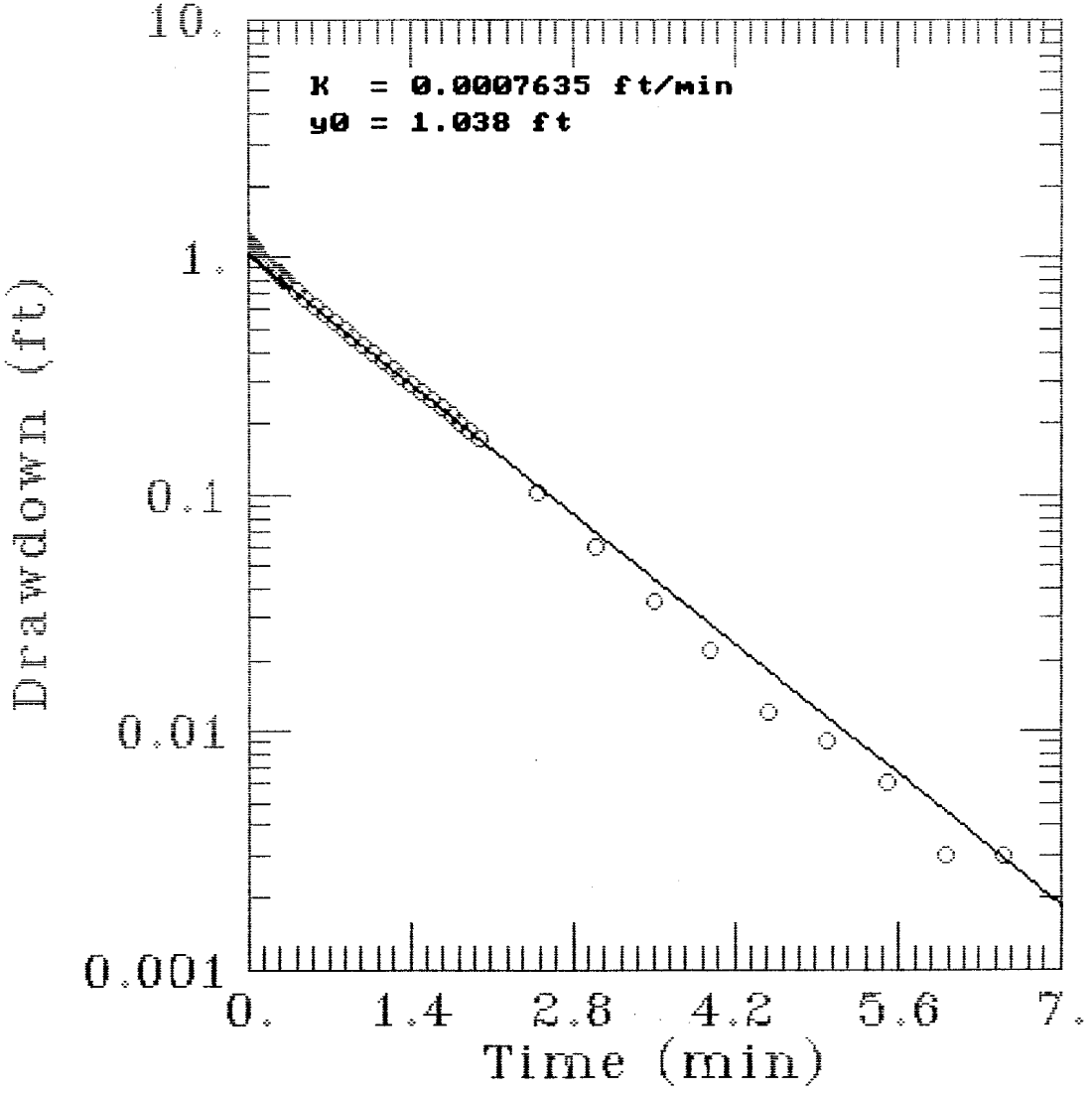
<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<>>

TYPE CURVE DATA

K = 4.82879E-004
y0 = 2.20746E+000

Time	Drawdown	Time	Drawdown	Time	Drawdown
0.000E+000	2.207E+000	9.000E+000	1.307E-002		

KYW-127-MW6 RUN#1



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Version 1.10

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TEST DESCRIPTION

Data set........... A:127MW6R1.SET
Data set title..... KYW-127-MW6 RUN#1

Knowns and Constants:
- No. of data points.................... 54
- Radius of well casing.............. 0.083
- Radius of well...................... 0.334
- Aquifer saturated thickness......... 8.29
- Well screen length.................. 10
- Static height of water in well...... 8.29
- Log(Re/Rw)......................... 2.45
- A, B, C............................ 0.000, 0.000, 1.967

ANALYTICAL METHOD

Bouwer-Rice (Unconfined Aquifer Slug Test)

RESULTS FROM VISUAL CURVE MATCHING

VISUAL MATCH PARAMETER ESTIMATES

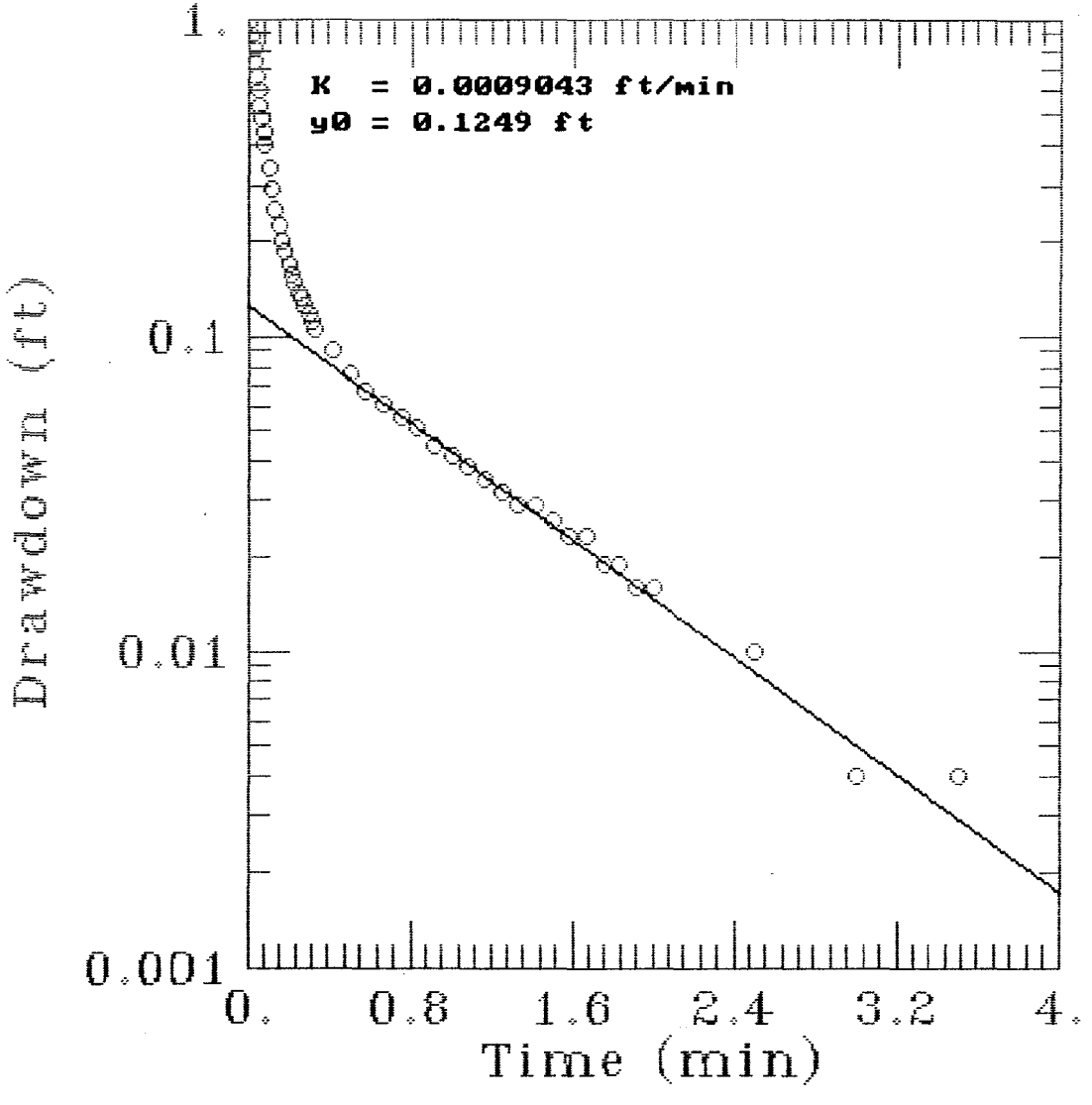
	Estimate
K =	8.1230E-004
y0 =	0.0000E+000

TYPE CURVE DATA

K = 7.63452E-004
y0 = 1.03850E+000

Time	Drawdown	Time	Drawdown	Time	Drawdown
0.000E+000	1.038E+000	7.000E+000	1.845E-003		

KYW-127-MW6 RUN#2



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GERAGHTY & MILLER, INC.

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TEST DESCRIPTION

Data set........... A:127MW6R2.SET
Data set title..... KYW-127-MW6 RUN#2

Knowns and Constants:

No. of data points..................	48
Radius of well casing...............	0.083
Radius of well......................	0.334
Aquifer saturated thickness.........	8.29
Well screen length..................	10
Static height of water in well......	8.29
Log(Re/Rw)..........................	2.45
A, B, C.............................	0.000, 0.000, 1.967

==

ANALYTICAL METHOD

Bouwer-Rice (Unconfined Aquifer Slug Test)

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RESULTS FROM VISUAL CURVE MATCHING

VISUAL MATCH PARAMETER ESTIMATES

	Estimate
K =	1.3017E-003
y0 =	-7.7451E+304

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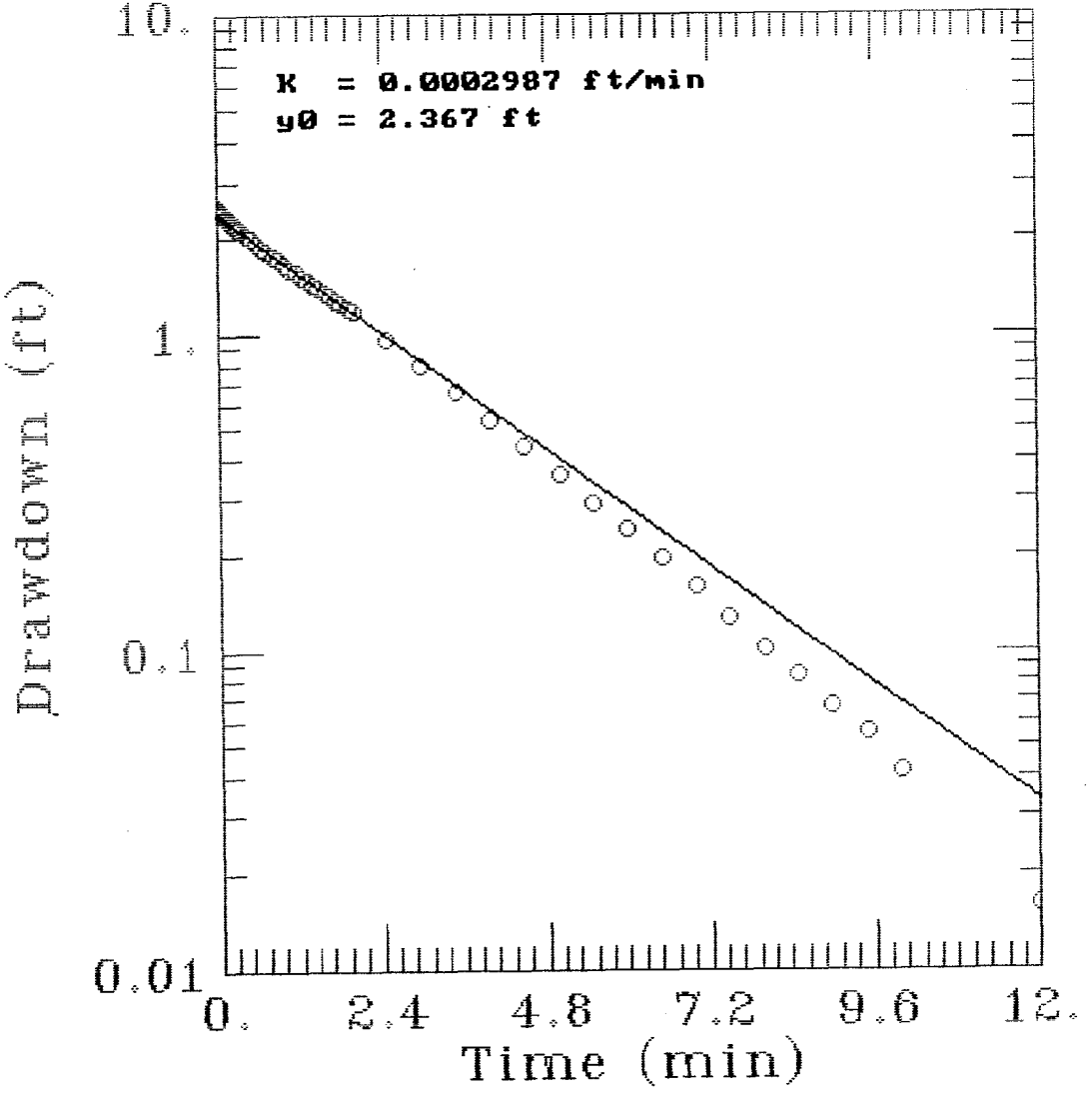
TYPE CURVE DATA

K = 9.04312E-004
y0 = 1.24902E-001

Time	Drawdown	Time	Drawdown	Time	Drawdown
0.000E+000	1.249E-001	4.000E+000	1.717E-003		

KYW-127-MW6 RUN#3



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GERAGHTY & MILLER, INC.

Modeling Group

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Version 1.10

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TEST DESCRIPTION

Data set........... A:127MW6R3.SET
Data set title..... KYW-127-MW6 RUN#3

Knowns and Constants:
No. of data points.................... 62
Radius of well casing................. 0.083
Radius of well........................ 0.334
Aquifer saturated thickness........... 8.29
Well screen length.................... 10
Static height of water in well........ 8.29
Log(Re/Rw)............................ 2.45
A, B, C............................... 0.000, 0.000, 1.967

ANALYTICAL METHOD

Bouwer-Rice (Unconfined Aquifer Slug Test)

RESULTS FROM VISUAL CURVE MATCHING

VISUAL MATCH PARAMETER ESTIMATES

	Estimate
K =	3.3873E-004
y0 =	-7.7451E+304

<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<>>

TYPE CURVE DATA

K = 2.98722E-004
y0 = 2.36728E+000

Time	Drawdown	Time	Drawdown	Time	Drawdown
0.000E+000	2.367E+000	1.200E+001	3.383E-002		

APPENDIX E

GROUNDWATER ANALYTICAL DATA

ENSECO-WADSWORTH/ALERT Laboratories
Division of Corning Lab Services Inc

5910 Breckenridge Parkway, Suite H
Tampa, FL 33610

813-621-0784
FAX 813-623-6021

ANALYTICAL REPORT

BOCA CHICA FLYING CLUB

21 OCTOBER 1993

Presented to:

ROGER DURHAM

ABB ENVIRONMENTAL SERVICES, INC.

ENSECO-WADSWORTH/ALERT LABORATORIES

Chris Amstutz
Project Manager

Randall C. Grubbs
Laboratory Director - Florida

November 19, 1993

ENSECO-WADSWORTH/ALERT
Laboratories

Laboratory ID #	Narrative
3J2201-1,2,3,6,17,18,20,21	Due to suspected matrix interference, surrogate recoveries for trifluorotoluene for the volatile organic compound analyses for these samples were outside established laboratory control limits. A second sample preparation and analysis confirmed the interferences and the original data is presented in this report.
3J2201-13,14,15,17,23	The concurrently analyzed laboratory blank associated with the volatile organic analysis of these samples contained methylene chloride at greater than five times the reported detection limit. Methylene chloride is a common laboratory contaminant and its presence in the samples should be considered suspect. A second sample preparation and analysis yielded no presence of methylene chloride in the associated laboratory blank. However, these analyses were performed after the EPA recommended holding time had been exceeded. Both sets of data are included in this report.
3J2201-20MS & MSD	The relative percent difference (RPD) for the semi-volatile organic compound analysis for the matrix spike/matrix spike duplicate (MS/MSD) exceeded laboratory established quality control criteria. An intial analysis of the MS/MSD provided acceptable RPDs. However, these samples were analyzed after the method tune time had expired. Both sets of data are included in this report.

ENSECO-WADSWORTH/ALERT Laboratories
Division of Corning Lab Servies, Inc.

5910 Breckenridge Parkway, Suite H
Tampa, FL 33610

813-621-0784
FAX 813-623-6021

January 20, 1994

Roger Durham
2590 Executive Center Circle East
Tallahassee, FL 32301

Re: Boca Chica Flying Club

Dear Roger,

As per your request the following data is provided. The 1,2-dichloroethene results for these samples was previously reported as "total". In some instances the "total" result may not equal the "cis" and "trans" due to rounding of results prior to reporting.

ABB ID	Enseco ID	Cis-1,2-DCE ppb	Trans-1,2-DCE ppb	Total-1,2-DCE ppb
MW-14D	J2201-14	14	ND	14
MW-15D	J2201-15	38	2	39
MW-18	J2201-18	2	3	5
MW-19	J2201-19	5	12	16

In addition, undiluted results are not available for samples MW-1, MW-2, MW-4, and MW-6. Each of these samples was screened prior to analysis. The screen results were used to determine the proper dilution needed to ensure that detected analytes were within the instrument calibration range.

If you need further assistance please do not hesitate to contact me.

Sincerely,

Chris Amstutz

Chris Amstutz
Project Manager

ENSECO-WADSWORTH/ALERT
Laboratories

INVOLVEMENT

This report summarizes the analytical results of the Boca Chica Flying Club site submitted by ABB Environmental Services, Inc. to Enseco-Wadsworth/ALERT Laboratories who provided independent, analytical services for this project under the direction of Roger Durham. The samples were accepted into Wadsworth's Florida facility on 21 October 1993, in accordance with documented sample acceptance procedures. The associated analytical methods and sample results are outlined sequentially in this report.

Analytical results included in this report have been reviewed for compliance with the Laboratory QA/QC Plan as summarized in the Quality Control Section at the rear of the report. Sample custody documentation describing the number of samples and sample matrices is also included. Any qualifications and/or non-compliant items have been noted below.

Laboratory ID #	Narrative
3J2201-14	Due to suspected purging inefficiency, the internal standard response for the volatile organic analysis of this sample failed to meet quality control criteria. A second sample preparation and analysis yielded acceptable results. However, this analysis was performed after the EPA recommended holding time had been exceeded. Both sets of data are included in this report.
3J2201	Due to the presence of bromoform in these samples, the surrogate for the ethylene dibromide analyses exceeded established laboratory control limits.
3J2201	Due to limited sample volume, a matrix spike/matrix spike duplicate for Total Petroleum Hydrocarbons was not performed on these samples.

ENSECO-WADSWORTH/ALERT
Laboratories

ANALYTICAL METHODS

Wadsworth/ALERT Laboratories utilizes only USEPA approved analytical methods ar
instrumentation. The analytical methods utilized for the analysis of thes
samples are listed below.

PARAMETER	METHOD
ORGANICS	
Volatile Organics	** EPA Method 601/2
Ethylene Dibromide	** EPA Method 601 Mod.
Polynuclear Aromatic Hydrocarbons	** EPA Method 625
METALS	
Lead	** EPA Method 239.2
MISCELLANEOUS	
Tot. Rec. Petroleum Hydrocarbons	** EPA Method 418.1
Total Dissolved Solids	** EPA Method 160.1

NOTE:	** Indicates usage of this method to obtain results for thi report.
(D)	Indicates draft version of this method was used
EPA Methods	Methods for Chemical Analysis of Water and Wastes, USEPA, 600/4 79-020, March, 1983. July, 1982 Drinking Waters USEPA, 600/4-88/039, December, 1988.
Std. Methods	Standard Methods for the Examination of Water and Waste-water APHA, 16th edition, 1985.
USEPA Methods	From 40CFR Part 136, published in Federal Register on Octobe 26, 1984.
SW846 Methods	Test Methods for Evaluating Solid Waste Physical/Chem Methods, 3rd Edition, USEPA, 1986.
ASTM Methods	American Society for Testing and Materials.
NIOSH Method	NIOSH Manual of Analytical Methods, National Institute fo Occupational Safety and Health, 2nd Edition, April 1977.

ENSECO-WADSWORTH/ALERT Laboratories
Division of Corning Lab Services, Inc.

5910 Breckenridge Parkway, Suite H 813-621-0784
Tampa, FL 33610 FAX 813-623-6021

January 5, 1994

Mr. John McVoy
ABB Environmental Services, Inc.
2590 Executive Circle East
Tallahassee, Florida 32301

Dear John:

I have reviewed the analytical report submitted by Enseco for the Boca Chica Flying Club site dated November 19, 1993. I offer the following comments regarding your concerns and data usability.

1. Presence of Dichloromethane - 601/602 Analyses

Major facility modifications have significantly lowered the occurrences of DCM in volatile blanks. However, random occurrences still persist. Enseco's policy, as outlined in our facility QAP, is to recognize (as EPA does) that DCM is a common laboratory background contaminant, and may be present at up to five times (5x) the reporting limit. Should DCM exceed 5x in the laboratory blank, corrective action should occur which includes reanalysis of the samples associated with that blank. In this case, reanalyses yielded similar results to the original, even though they were performed past hold time. For data qualification purposes, original (in hold-time) data should be used for all 601/2 compounds except DCM. For DCM, both sets of reported data for this compound should be evaluated and qualified per the EPA functional guidelines for organics analyses. EPA and DEP have a history of allowing use of data from reanalyses performed past hold-time for qualitative and confirmational purposes. I did not see any sample data where detection limits for other target analytes were compromised by the presence of DCM.

2. Surrogates Outside Control Criteria - 601/2 Analyses

A consistent matrix interference effect (i.e. coelution) was observed during the 601/2 analyses for several samples, as outlined in the case narrative. Enseco policy, per the facility QAP requires reanalysis in this case to confirm that a sample matrix effect was indeed present, and that there was no system or instrument problems. Reanalysis was performed to confirm the matrix effect and the original results. The final reported data should be interpreted accordingly, with respect to the confirmed presence of interferents with the analysis of aromatic volatiles (602 compounds).

3. Bromoform Surrogate Recoveries for EDB Analyses

EDB analyses were performed by DEP method 601-modified as required in FAC 17-770. Due to compound similarity, Enseco uses Bromoform as a surrogate to track system performance on an individual sample basis. Every sample (except the equipment blank) showed matrix interference - either Bromoform was present, or a coeluting interferent was present. Due to the sample interference, elevated recoveries occurred. All 22 affected samples were reanalyzed to confirm the sample effect. EDB data can be qualified as "ND" at the reporting limit despite the high surrogate recovery. Only in cases of low or no surrogate recovery does the reporting limit typically come into question. The laboratory followed policies in its QAP to confirm a sample matrix effect.

4. Internal Standard Response Problem (601/2) for 3J2201-14

The low internal standard response for this sample was observed and noted by the laboratory. Per the QAP, the sample was reanalyzed to find out whether an instrument malfunction or sample interference had occurred. The reanalysis showed an instrument problem occurred during the first analysis. Both sets of data were reported. The difference in concentrations observed is due to the difference in internal standard response. The reanalysis, which met internal standard criteria, would be considered quantitative data, had it not been performed outside of hold-time. In this case, final sample data should be interpreted as qualitative. A resampling and reanalysis could be used to confirm this data.

5. Matrix Spike Duplicates for PAH Analyses - 3J2201-1 and -20

Two matrix spike duplicates were performed for this batch of twenty-three samples. The MS/MSD performed on 3J2201-1 met all criteria as specified in our QAP - i.e. the duplicate data must be within RPD/precision limits for control compounds. The narrative for 3J220-20MS and MSD was incorrect in stating that an original analysis, out of tune-time, met all RPD criteria. In fact, this analysis also showed the RPD to be above control criteria for Naphthalene. Three analyses were attempted for the MS/MSD, each resulting in high precision for one or more control compound. Enseco policy defines Matrix Spike Duplicates as sample-specific quality control. Due to the unavailability of additional sample for 3J2201-20, another Matrix Spike Duplicate was not extracted. For data qualification purposes, 3J2201-20 were "ND".

Although it is unclear whether sample matrix effects contributed to the high precision values for the MS/MSD (due to lack of sample available for reextract), the MS/MSD recovery results do allow qualification of non-detected analytes in the sample itself. All spiked analytes were recovered above sixty percent (60%). (Note: The MS/MSD results for 3J2201-1 were inadvertently omitted from the original report, and are attached here.)

6. LCS Results Associated With 601/602 Analyses

The report does not contain batch numbers which allow easy associated of QC and sample data - other than by date. (This has been rectified over the past two months as we convert to a new LIMS.) The attached pages outline the dates and times of samples and associated QC for your use. I've included analysis time so that the analytical sequence is evident.

In summary, I've tried to outline the corrective action procedures employed by the laboratory when anomalies arose during this project. Although a two-page case narrative outlining multiple anomalies and reanalyses may seem daunting, it also serves inform the end data user and to demonstrate a consistent and systematic approach to assessing sample and QC data anomalies. Instances such as reanalyses due to surrogate problems with the 601/602 and EDB analyses are common examples of additional information supplied by the lab to allow proper interpretation of the data. In many cases (as you are aware), sample holding time restrictions do not allow for corrective action and confirmational analyses to take place within hold-time. In these cases, all data is reported to allow decisions on data usability to be made while assessing all available information. As I mentioned, it has been our experience that both DEP and EPA typically recognize confirmational or qualitative information from reanalyses performed after holding time has expired in cases where both analyses produce comparable data.

Please call me at (813) 621-0784 if you have any questions or wish to further discuss the content and usability of this data. Should we agree, in fact, that portions of this data prove to not meet QAP or regulatory requirements for this project, I would be happy to offer assistance in expediting any necessary reanalysis required due to recollection of samples.

Sincerely,

Enseco Laboratories

Randall C. Grubbs
Laboratory Director

315\BR\9\ABBMCVOY.LTR

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB # 3J2201-1
MATRIX: WATER

DATE RECEIVED: 10/21/9
DATE EXTRACTED: N/
DATE ANALYZED: 11/ 2, 9

SAMPLE ID: MW-1 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
METHOD 601/602 - GC

Benzene	13	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	130
2-Chloroethylvinyl ether	ND	Methylene chloride	16 B
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	12
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	24
		Methyl-tert-butylether	25

NOTE: ND (None Detected, lower detectable limit = 5 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	87	(78-122)
Trifluorotoluene (PID)	633	(73-131)

ENSECO-WADSWORTH/ALERT
Laboratories

?ANY: ABB ENVIRONMENTAL SERVICES, INC.
ɓ #: 3J2201-1
MATRIX: WATER

DATE RECEIVED: 10/21/93
DATE EXTRACTED: NA
DATE ANALYZED: 10/28/93

SAMPLE ID: MW-1 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
Bromoform (ECD)	(41-152)	(41-152)	176

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3J2201-1
MATRIX: WATER

DATE RECEIVED: 10/21
DATE EXTRACTED: 10/26, 3
DATE ANALYZED: 11/ 5/93

SAMPLE ID: MW-1 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059

POLYNUCLEAR AROMATIC HYDROCARBONS HRS84297
METHOD 625 HSL/TCL LIST - GC/MS

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	5
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	12
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenz(a,h)anthracene	9
Fluoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	9
1-Methylnaphthalene	18
2-Methylnaphthalene	48
Naphthalene	120
Phenanthrene	ND
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS WATER	SOLID
Nitrobenzene-d5	77	(22-135)	(10-155)
Fluorobiphenyl	78	(34-140)	(12-153)
Terphenyl-d14	45	(10-132)	(13-140)

ENSECO-WADSWORTH/ALERT
Laboratories

PANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 10/21/93
3 #: 3J2201-1
MATRIX : WATER

SAMPLE ID : MW-1 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

METALS ANALYTICAL REPORT
SELECTED LIST

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	11/ 3/93	9	5	ug/

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 10/21/9
LAB #: 3J2201-1
MATRIX : WATER

SAMPLE ID : MW-1 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

ANALYTICAL REPORT

PARAMETER	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Tot Recoverable Pet Hydrocarbons	11/ 1/93	3	1	mg/L

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

.PANY: ABB ENVIRONMENTAL SERVICES, INC.
.B # 3J2201-2
MATRIX: WATER

DATE RECEIVED: 10/21/93
DATE EXTRACTED: NA
DATE ANALYZED: 11/ 2/93

SAMPLE ID: MW-2 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
METHOD 601/602 - GC

Benzene	150	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	7
2-Chloroethylvinyl ether	ND	Methylene chloride	11 B
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
ıoromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	10
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	20
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 5 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
nochloromethane (HECD)	85	(78-122)
ıfluorotoluene (PID)	188	(73-131)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3J2201-2
MATRIX: WATER

DATE RECEIVED: 10/21
DATE EXTRACTED: NA
DATE ANALYZED: 10/28/93

SAMPLE ID: MW-2 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
Bromoform (ECD)	(41-152)	(41-152)	286

ENSECO-WADSWORTH/ALERT
Laboratories

MPANY: ABB ENVIRONMENTAL SERVICES, INC.
AB #: 3J2201-2
MATRIX: WATER

DATE RECEIVED: 10/21/93
DATE EXTRACTED: 10/26/93
DATE ANALYZED: 10/30/93

SAMPLE ID: MW-2 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

POLYNUCLEAR AROMATIC HYDROCARBONS
METHOD 625 HSL/TCL LIST - GC/MS

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
.benz(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	ND
2-Methylnaphthalene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS WATER	SOLID
.trobenzene-d5	64	(22-135)	(10-155)
.luorobiphenyl	65	(34-140)	(12-153)
Terphenyl-d14	47	(10-132)	(13-140)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 10/21/9
LAB #: 3J2201-2
MATRIX : WATER

SAMPLE ID : MW-2 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

METALS ANALYTICAL REPORT
SELECTED LIST

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	11/ 3/93	ND	5	ug/

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

.PANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 10/21/93
B #: 3J2201-2
MATRIX : WATER

SAMPLE ID : MW-2 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

ANALYTICAL REPORT

PARAMETER	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Tot Recoverable Pet Hydrocarbons	11/ 1/93	2	1	mg/L

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB # 3J2201-3
MATRIX: WATER

DATE RECEIVED: 10/21/
DATE EXTRACTED: NA
DATE ANALYZED: 11/ 2/93

SAMPLE ID: MW-3 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
METHOD 601/602 - GC

Benzene	1	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	3 B
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	1
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	85	(78-122)
Trifluorotoluene (PID)	151	(73-131)

ENSECO-WADSWORTH/ALERT
Laboratories

PANY: ABB ENVIRONMENTAL SERVICES, INC.
3 #: 3J2201-3
MATRIX: WATER

DATE RECEIVED: 10/21/93
DATE EXTRACTED: NA
DATE ANALYZED: 10/29/93

SAMPLE ID: MW-3 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
Bromoform (ECD)	(41-152)	(41-152)	343

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3J2201-3
MATRIX: WATER

DATE RECEIVED: 10/21
DATE EXTRACTED: 10/26,
DATE ANALYZED: 11/ 5/93

SAMPLE ID: MW-3

BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

POLYNUCLEAR AROMATIC HYDROCARBONS
METHOD 625 HSL/TCL LIST - GC/MS

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenz(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	ND
2-Methylnaphthalene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS WATER	SOLID
Nitrobenzene-d5	69	(22-135)	(10-155)
Fluorobiphenyl	76	(34-140)	(12-153)
Terphenyl-d14	63	(10-132)	(13-140)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 10/21/93
LAB #: 3J2201-3
MATRIX : WATER

SAMPLE ID : MW-3 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

METALS ANALYTICAL REPORT
SELECTED LIST

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	11/ 3/93	ND	5	ug/L

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 10/21/9
LAB #: 3J2201-3
MATRIX : WATER

SAMPLE ID : MW-3 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

ANALYTICAL REPORT

PARAMETER	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Tot Recoverable Pet Hydrocarbons	11/ 1/93	ND	1	mg/L

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB # 3J2201-4
MATRIX: WATER

DATE RECEIVED: 10/21/93
DATE EXTRACTED: NA
DATE ANALYZED: 11/ 2/93

SAMPLE ID: MW-4 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
METHOD 601/602 - GC

Benzene	710	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
.oromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	130
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	460
		Methyl-tert-butylether	11

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
I- nochloromethane (HECD)	89	(78-122)
.fluorotoluene (PID)	115	(73-131)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3J2201-4
MATRIX: WATER

DATE RECEIVED: 10/27
DATE EXTRACTED: NA
DATE ANALYZED: 10/29/93

SAMPLE ID: MW-4 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
Bromoform (ECD)	(41-152)	(41-152)	306

ENSECO-WADSWORTH/ALERT
Laboratories

.PANY: ABB ENVIRONMENTAL SERVICES, INC.
B #: 3J2201-4
MATRIX: WATER

DATE RECEIVED: 10/21/93
DATE EXTRACTED: 10/26/93
DATE ANALYZED: 11/ 5/93

SAMPLE ID: MW-4 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

POLYNUCLEAR AROMATIC HYDROCARBONS
METHOD 625 HSL/TCL LIST - GC/MS

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Benz(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	ND
2-Methylnaphthalene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS WATER	SOLID
Nitrobenzene-d5	74	(22-135)	(10-155)
2-Fluorobiphenyl	76	(34-140)	(12-153)
Terphenyl-d14	40	(10-132)	(13-140)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 10/21/9
LAB #: 3J2201-4
MATRIX : WATER

SAMPLE ID : MW-4 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

METALS ANALYTICAL REPORT
SELECTED LIST

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	11/ 3/93	46	10	ug/l

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

ANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 10/21/93
#: 3J2201-4
MATRIX : WATER

SAMPLE ID : MW-4 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

ANALYTICAL REPORT

PARAMETER	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Tot Recoverable Pet Hydrocarbons	11/ 1/93	1	1	mg/L

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB # 3J2201-5
MATRIX: WATER

DATE RECEIVED: 10/21/9
DATE EXTRACTED: NA
DATE ANALYZED: 11/ 2/93

SAMPLE ID: MW-5 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	93	(78-122)
Trifluorotoluene (PID)	103	(73-131)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3J2201-5
MATRIX: WATER

DATE RECEIVED: 10/21/93
DATE EXTRACTED: NA
DATE ANALYZED: 10/29/93

SAMPLE ID: MW-5 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
Bromoform (ECD)	(41-152)	(41-152)	783

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3J2201-5
MATRIX: WATER

DATE RECEIVED: 10/21
DATE EXTRACTED: 10/26/93
DATE ANALYZED: 11/ 5/93

SAMPLE ID: MW-5 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059

POLYNUCLEAR AROMATIC HYDROCARBONS HRS84297
METHOD 625 HSL/TCL LIST - GC/MS

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	6
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenz(a,h)anthracene	5
Fluoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	ND
2-Methylnaphthalene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS WATER	SOLID
Nitrobenzene-d5	68	(22-135)	(10-155)
Fluorobiphenyl	77	(34-140)	(12-153)
Terphenyl-d14	40	(10-132)	(13-140)

ENSECO-WADSWORTH/ALERT
Laboratories

PANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 10/21/93
B #: 3J2201-5
MATRIX : WATER

SAMPLE ID : MW-5 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

METALS ANALYTICAL REPORT
SELECTED LIST

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	11/ 3/93	5	5	ug/

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 10/21/9
LAB #: 3J2201-5
MATRIX : WATER

SAMPLE ID : MW-5 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

ANALYTICAL REPORT

PARAMETER	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Tot Recoverable Pet Hydrocarbons	11/ 1/93	ND	1	mg/L

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

PANY: ABB ENVIRONMENTAL SERVICES, INC.
3 # 3J2201-6
MATRIX: WATER

DATE RECEIVED: 10/21/93
DATE EXTRACTED: NA
DATE ANALYZED: 11/ 2/93

SAMPLE ID: MW-6 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
METHOD 601/602 - GC

Benzene	68	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	140
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	15
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	82
		Methyl-tert-butylether	6

NOTE: ND (None Detected, lower detectable limit = 5 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	89	(78-122)
Trifluorotoluene (PID)	198	(73-131)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3J2201-6
MATRIX: WATER

DATE RECEIVED: 10/21/
DATE EXTRACTED: NA
DATE ANALYZED: 10/29/93

SAMPLE ID: MW-6 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
Bromoform (ECD)	(41-152)	(41-152)	274

ENSECO-WADSWORTH/ALERT
Laboratories

.PANY: ABB ENVIRONMENTAL SERVICES, INC.
.B #: 3J2201-6
MATRIX: WATER

DATE RECEIVED: 10/21/93
DATE EXTRACTED: 10/26/93
DATE ANALYZED: 10/30/93

SAMPLE ID: MW-6 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
POLYNUCLEAR AROMATIC HYDROCARBONS HRS84297
METHOD 625 HSL/TCL LIST - GC/MS

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
oenz(a,h)anthracene	ND
.luoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	ND
2-Methylnaphthalene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS WATER	SOLID
.robenzene-d5	56	(22-135)	(10-155)
.uorobiphenyl	53	(34-140)	(12-153)
Terphenyl-d14	24	(10-132)	(13-140)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 10/21/9
LAB #: 3J2201-6
MATRIX : WATER

SAMPLE ID : MW-6 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

METALS ANALYTICAL REPORT
SELECTED LIST

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	11/ 3/93	ND	5	ug/

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

.PANY : ABB ENVIRONMENTAL SERVICES, INC.
.B #: 3J2201-6
MATRIX : WATER

DATE RECEIVED: 10/21/93

SAMPLE ID : MW-6 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

ANALYTICAL REPORT

PARAMETER	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Tot Recoverable Pet Hydrocarbons	11/ 1/93	2	1	mg/l

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB # 3J2201-7
MATRIX: WATER

DATE RECEIVED: 10/21/
DATE EXTRACTED: NA
DATE ANALYZED: 11/ 2/93

SAMPLE ID: MW-7 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	107	(78-122)
Trifluorotoluene (PID)	104	(73-131)

ENSECO-WADSWORTH/ALERT
Laboratories

'ANY: ABB ENVIRONMENTAL SERVICES, INC.
#: 3J2201-7
MATRIX: WATER

DATE RECEIVED: 10/21/93
DATE EXTRACTED: NA
DATE ANALYZED: 10/29/93

SAMPLE ID: MW-7 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
Bromoform (ECD)	(41-152)	(41-152)	272

ENSECO-WADSWORTH/ALERT
Laboratories

PANY: ABB ENVIRONMENTAL SERVICES, INC.
B #: 3J2201-7
MATRIX: WATER

DATE RECEIVED: 10/21/93
DATE EXTRACTED: 10/26/93
DATE ANALYZED: 10/30/93

SAMPLE ID: MW-7 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
POLYNUCLEAR AROMATIC HYDROCARBONS HRS84297
METHOD 625 HSL/TCL LIST - GC/MS

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Benz(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	ND
2-Methylnaphthalene	ND
Naphthalene	7
Phenanthrene	ND
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS WATER	SOLID
Nitrobenzene-d5	57	(22-135)	(10-155)
2-Fluorobiphenyl	54	(34-140)	(12-153)
Terphenyl-d14	27	(10-132)	(13-140)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 10/21
LAB #: 3J2201-7
MATRIX : WATER

SAMPLE ID : MW-7 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

METALS ANALYTICAL REPORT
SELECTED LIST

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	11/ 3/93	ND	5	ug

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

?ANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 10/21/93
: 3J2201-7
MATRIX : WATER

SAMPLE ID : MW-7 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

ANALYTICAL REPORT

PARAMETER	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Tot Recoverable Pet Hydrocarbons	11/ 1/93	ND	1	mg/L

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB # 3J2201-8
MATRIX: WATER

DATE RECEIVED: 10/21/
DATE EXTRACTED: NA
DATE ANALYZED: 11/ 2/93

SAMPLE ID: MW-8 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	1
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	3	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	95	(78-122)
Trifluorotoluene (PID)	103	(73-131)

ENSECO-WADSWORTH/ALERT
Laboratories

PANY: ABB ENVIRONMENTAL SERVICES, INC.
3 #: 3J2201-8
MATRIX: WATER

DATE RECEIVED: 10/21/93
DATE EXTRACTED: NA
DATE ANALYZED: 10/29/93

SAMPLE ID: MW-8 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
Bromoform (ECD)	(41-152)	(41-152)	400

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3J2201-8
MATRIX: WATER

DATE RECEIVED: 10/2?
DATE EXTRACTED: 10/2(3
DATE ANALYZED: 11/ 5/93

SAMPLE ID: MW-8 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

POLYNUCLEAR AROMATIC HYDROCARBONS
METHOD 625 HSL/TCL LIST - GC/MS

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenz(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	ND
2-Methylnaphthalene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS WATER	SOLID
Nitrobenzene-d5	69	(22-135)	(10-155)
Fluorobiphenyl	73	(34-140)	(12-153)
Terphenyl-d14	36	(10-132)	(13-140)

ENSECO-WADSWORTH/ALERT
Laboratories

IPANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 10/21/93
B #: 3J2201-8
MATRIX : WATER

SAMPLE ID : MW-8 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

METALS ANALYTICAL REPORT
SELECTED LIST

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	11/ 3/93	ND	5	ug/

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 10/21/9
LAB #: 3J2201-8
MATRIX : WATER

SAMPLE ID : MW-8 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

ANALYTICAL REPORT

PARAMETER	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Tot Recoverable Pet Hydrocarbons	11/ 1/93	ND	1	mg/L

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

PANY: ABB ENVIRONMENTAL SERVICES, INC.
AB # 3J2201-9
MATRIX: WATER

DATE RECEIVED: 10/21/93
DATE EXTRACTED: NA
DATE ANALYZED: 11/ 2/93

SAMPLE ID: MW-9 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Dibromomethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
mochloromethane (HECD)	92	(78-122)
ifluorotoluene (PID)	103	(73-131)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3J2201-9
MATRIX: WATER

DATE RECEIVED: 10/21/
DATE EXTRACTED: NA
DATE ANALYZED: 10/29/93

SAMPLE ID: MW-9 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
Bromoform (ECD)	(41-152)	(41-152)	212

ENSECO-WADSWORTH/ALERT
Laboratories

IPANY: ABB ENVIRONMENTAL SERVICES, INC.
AB #: 3J2201-9
MATRIX: WATER

DATE RECEIVED: 10/21/93
DATE EXTRACTED: 10/26/93
DATE ANALYZED: 11/ 5/93

SAMPLE ID: MW-9 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

POLYNUCLEAR AROMATIC HYDROCARBONS
METHOD 625 HSL/TCL LIST - GC/MS

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Benz(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	ND
2-Methylnaphthalene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS WATER	SOLID
Nitrobenzene-d5	92	(22-135)	(10-155)
2-Fluorobiphenyl	94	(34-140)	(12-153)
Terphenyl-d14	54	(10-132)	(13-140)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 10/21
LAB #: 3J2201-9
MATRIX : WATER

SAMPLE ID : MW-9 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

METALS ANALYTICAL REPORT
SELECTED LIST

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	11/ 3/93	5	5	ug/

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 10/21/93
LAB #: 3J2201-9
MATRIX : WATER

SAMPLE ID : MW-9 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

ANALYTICAL REPORT

PARAMETER	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Tot Recoverable Pet Hydrocarbons	11/ 1/93	ND	1	mg/L

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB # 3J2201-10
MATRIX: WATER

DATE RECEIVED: 10/21/
DATE EXTRACTED: NA
DATE ANALYZED: 11/ 2/93

SAMPLE ID: MW-10 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
METHOD 601/602 - GC

Benzene	2	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	3
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	3
1,2-Dichlorobenzene	1	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	3
		Methyl-tert-butylether	1

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	91	(78-122)
Trifluorotoluene (PID)	116	(73-131)

ENSECO-WADSWORTH/ALERT
Laboratories

MPANY: ABB ENVIRONMENTAL SERVICES, INC.
AB #: 3J2201-10
MATRIX: WATER

DATE RECEIVED: 10/21/93
DATE EXTRACTED: NA
DATE ANALYZED: 10/29/93

SAMPLE ID: MW-10 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTIO LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
Bromoform (ECD)	(41-152)	(41-152)	517

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3J2201-10
MATRIX: WATER

DATE RECEIVED: 10/21
DATE EXTRACTED: 10/26
DATE ANALYZED: 11/ 5/93

SAMPLE ID: MW-10 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

POLYNUCLEAR AROMATIC HYDROCARBONS
METHOD 625 HSL/TCL LIST - GC/MS

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenz(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	ND
2-Methylnaphthalene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS WATER	SOLID
Nitrobenzene-d5	80	(22-135)	(10-155)
Fluorobiphenyl	88	(34-140)	(12-153)
Terphenyl-d14	49	(10-132)	(13-140)

ENSECO-WADSWORTH/ALERT
Laboratories

PANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 10/21/93
J #: 3J2201-10
MATRIX : WATER

SAMPLE ID : MW-10 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

METALS ANALYTICAL REPORT
SELECTED LIST

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	11/ 3/93	ND	5	ug/

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.
DATE RECEIVED: 10/21/9
LAB #: 3J2201-10
MATRIX : WATER

SAMPLE ID : MW-10 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

ANALYTICAL REPORT

PARAMETER	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Total Dissolved Solids	10/25-10/26/93	740	5	mg/L
Tot Recoverable Pet Hydrocarbons	11/ 1/93	2	1	mg/L

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

'ANY: ABB ENVIRONMENTAL SERVICES, INC.
3 # 3J2201-11
MATRIX: WATER

DATE RECEIVED: 10/21/93
DATE EXTRACTED: NA
DATE ANALYZED: 11/ 2/93

SAMPLE ID: MW-11 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
oromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
E ochloromethane (HECD)	104	(78-122)
fluorotoluene (PID)	106	(73-131)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3J2201-11
MATRIX: WATER

DATE RECEIVED: 10/21
DATE EXTRACTED: NA
DATE ANALYZED: 10/29/93

SAMPLE ID: MW-11 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
Bromoform (ECD)	(41-152)	(41-152)	2,106

ENSECO-WADSWORTH/ALERT
Laboratories

PANY: ABB ENVIRONMENTAL SERVICES, INC.
B #: 3J2201-11
MATRIX: WATER

DATE RECEIVED: 10/21/93
DATE EXTRACTED: 10/26/93
DATE ANALYZED: 11/ 5/93

SAMPLE ID: MW-11 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

POLYNUCLEAR AROMATIC HYDROCARBONS
METHOD 625 HSL/TCL LIST - GC/MS

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Benz(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	ND
2-Methylnaphthalene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS WATER	SOLID
Nitrobenzene-d5	75	(22-135)	(10-155)
2-Fluorobiphenyl	83	(34-140)	(12-153)
Terphenyl-d14	49	(10-132)	(13-140)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 10/21/9
LAB #: 3J2201-11
MATRIX : WATER

SAMPLE ID : MW-11 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

METALS ANALYTICAL REPORT
SELECTED LIST

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	11/ 3/93	65	20	ug/

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

PANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 10/21/93
B #: 3J2201-11
MATRIX : WATER

SAMPLE ID : MW-11 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

ANALYTICAL REPORT

PARAMETER	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Tot Recoverable Pet Hydrocarbons	11/ 2/93	ND	1	mg/l

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB # 3J2201-12
MATRIX: WATER

DATE RECEIVED: 10/21
DATE EXTRACTED: NA
DATE ANALYZED: 11/ 2/93

SAMPLE ID: MW-12 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'
ND* (None Detected, lower detectable limit = ug/L) as rec'
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	101	(78-122)
Trifluorotoluene (PID)	105	(73-131)

ENSECO-WADSWORTH/ALERT
Laboratories

MPANY: ABB ENVIRONMENTAL SERVICES, INC.
AB #: 3J2201-12
MATRIX: WATER

DATE RECEIVED: 10/21/93
DATE EXTRACTED: NA
DATE ANALYZED: 10/29/93

SAMPLE ID: MW-12 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTIO LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
Bromoform (ECD)	(41-152)	(41-152)	473

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3J2201-12
MATRIX: WATER

DATE RECEIVED: 10/2
DATE EXTRACTED: 10/2 93
DATE ANALYZED: 11/ 5/93

SAMPLE ID: MW-12 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

POLYNUCLEAR AROMATIC HYDROCARBONS
METHOD 625 HSL/TCL LIST - GC/MS

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenz(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	ND
2-Methylnaphthalene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS WATER	SOLID
Nitrobenzene-d5	71	(22-135)	(10-155)
Fluorobiphenyl	81	(34-140)	(12-153)
Terphenyl-d14	57	(10-132)	(13-140)

ENSECO-WADSWORTH/ALERT
Laboratories

PANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 10/21/93
B #: 3J2201-12
MATRIX : WATER

SAMPLE ID : MW-12 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

METALS ANALYTICAL REPORT
SELECTED LIST

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	11/ 3/93	ND	5	ug/

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 10/21/
LAB #: 3J2201-12
MATRIX : WATER

SAMPLE ID : MW-12 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

ANALYTICAL REPORT

PARAMETER	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Tot Recoverable Pet Hydrocarbons	11/ 2/93	ND	1	mg/L

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

PANY: ABB ENVIRONMENTAL SERVICES, INC.
B # 3J2201-13
MATRIX: WATER

DATE RECEIVED: 10/21/93
DATE EXTRACTED: NA
DATE ANALYZED: 11/ 2/93

SAMPLE ID: MW-13 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	45 B
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
oromethane	ND	Tetrachloroethene	ND
ibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
r nochloromethane (HECD)	85	(78-122)
fluorotoluene (PID)	106	(73-131)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3J2201-13
MATRIX: WATER

DATE RECEIVED: 10/21/
DATE EXTRACTED: NA
DATE ANALYZED: 10/29/93

SAMPLE ID: MW-13 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
Bromoform (ECD)	(41-152)	(41-152)	345

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3J2201-13
MATRIX: WATER

DATE RECEIVED: 10/21/93
DATE EXTRACTED: 10/26/93
DATE ANALYZED: 10/30/93

SAMPLE ID: MW-13 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059

POLYNUCLEAR AROMATIC HYDROCARBONS HRS84297
METHOD 625 HSL/TCL LIST - GC/MS

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Benz(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	ND
2-Methylnaphthalene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS WATER	SOLID
Nitrobenzene-d5	83	(22-135)	(10-155)
2-Fluorobiphenyl	77	(34-140)	(12-153)
Terphenyl-d14	32	(10-132)	(13-140)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 10/21/
LAB #: 3J2201-13
MATRIX : WATER

SAMPLE ID : MW-13 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059

METALS ANALYTICAL REPORT HRS84297
SELECTED LIST

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	11/ 3/93	8	5	ug/

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

PANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 10/21/93
3 #: 3J2201-13
MATRIX : WATER

SAMPLE ID : MW-13 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

ANALYTICAL REPORT

PARAMETER	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Tot Recoverable Pet Hydrocarbons	11/ 2/93	ND	1	mg/L

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB # 3J2201-14
MATRIX: WATER

DATE RECEIVED: 10/2[illegible]
DATE EXTRACTED: NA
DATE ANALYZED: 11/ 2/93

SAMPLE ID: MW-14D BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
METHOD 601/602 - GC

Benzene	2	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	14
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	1
2-Chloroethylvinyl ether	ND	Methylene chloride	6 B
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	4	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	3
		Methyl-tert-butylether	7

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	101	(78-122)
Trifluorotoluene (PID)	115	(73-131)

ENSECO-WADSWORTH/ALERT
Laboratories

IPANY: ABB ENVIRONMENTAL SERVICES, INC.
B #: 3J2201-14
MATRIX: WATER

DATE RECEIVED: 10/21/93
DATE EXTRACTED: NA
DATE ANALYZED: 10/29/93

SAMPLE ID: MW-14D BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
Bromoform (ECD)	(41-152)	(41-152)	727

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3J2201-14
MATRIX: WATER

DATE RECEIVED: 10/21
DATE EXTRACTED: 10/26,
DATE ANALYZED: 10/30/93

SAMPLE ID: MW-14D BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

POLYNUCLEAR AROMATIC HYDROCARBONS
METHOD 625 HSL/TCL LIST - GC/MS

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenz(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	ND
2-Methylnaphthalene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS WATER	SOLID
Nitrobenzene-d5	79	(22-135)	(10-155)
Fluorobiphenyl	78	(34-140)	(12-153)
Terphenyl-d14	54	(10-132)	(13-140)

ENSECO-WADSWORTH/ALERT
Laboratories

.PANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 10/21/93
.B #: 3J2201-14
MATRIX : WATER

SAMPLE ID : MW-14D BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

METALS ANALYTICAL REPORT
SELECTED LIST

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	11/ 3/93	ND	5	ug/

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 10/21/9
LAB #: 3J2201-14
MATRIX : WATER

SAMPLE ID : MW-14D BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

ANALYTICAL REPORT

PARAMETER	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Total Dissolved Solids	10/25-10/26/93	3,100	5	mg/L
Tot Recoverable Pet Hydrocarbons	11/ 2/93	ND	1	mg/L

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB # 3J2201-15
MATRIX: WATER

DATE RECEIVED: 10/21/93
DATE EXTRACTED: NA
DATE ANALYZED: 11/ 2/93

SAMPLE ID: MW-15D BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	10
Bromoform	ND	1,2-Dichloroethene (Total)	39
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	2	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	7 B
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
.oromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	1
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	11	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
F nochloromethane (HECD)	102	(78-122)
fluorotoluene (PID)	107	(73-131)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3J2201-15
MATRIX: WATER

DATE RECEIVED: 10/21/9[illegible]
DATE EXTRACTED: NA
DATE ANALYZED: 10/29/93

SAMPLE ID: MW-15D BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
Bromoform (ECD)	(41-152)	(41-152)	261

ENSECO-WADSWORTH/ALERT
Laboratories

'ANY: ABB ENVIRONMENTAL SERVICES, INC.
#: 3J2201-15
MATRIX: WATER

DATE RECEIVED: 10/21/93
DATE EXTRACTED: 10/26/93
DATE ANALYZED: 10/30/93

SAMPLE ID: MW-15D BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

POLYNUCLEAR AROMATIC HYDROCARBONS
METHOD 625 HSL/TCL LIST - GC/MS

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
enz(a,h)anthracene	ND
luoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	ND
2-Methylnaphthalene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS WATER	SOLID
obenzene-d5	77	(22-135)	(10-155)
luorobiphenyl	72	(34-140)	(12-153)
Terphenyl-d14	69	(10-132)	(13-140)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 10/21/9
LAB #: 3J2201-15
MATRIX : WATER

SAMPLE ID : MW-15D BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

METALS ANALYTICAL REPORT
SELECTED LIST

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	11/ 3/93	ND	5	ug/l

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

ANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 10/21/93
#: 3J2201-15
MATRIX : WATER

SAMPLE ID : MW-15D BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

ANALYTICAL REPORT

PARAMETER	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Tot Recoverable Pet Hydrocarbons	11/ 2/93	ND	1	mg/L

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB # 3J2201-16
MATRIX: WATER

DATE RECEIVED: 10/21/
DATE EXTRACTED: NA
DATE ANALYZED: 11/ 2/93

SAMPLE ID: MW-16 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	1 B
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	90	(78-122)
Trifluorotoluene (PID)	106	(73-131)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
#: 3J2201-16
MATRIX: WATER

DATE RECEIVED: 10/21/93
DATE EXTRACTED: NA
DATE ANALYZED: 10/29/93

SAMPLE ID: MW-16 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
Bromoform (ECD)	(41-152)	(41-152)	466

ENSEC[illegible] WADSWORTH/ALERT
[illegible]ratories

COMPANY: ABB ENV[illegible]MENTAL SERVICES, INC.
LAB #: 3J2201-16
MATRIX: WATER

DATE RECEIVED: 10/21/
DATE EXTRACTED: 10/26/
DATE ANALYZED: 10/30/93

SAMPLE ID: MW-16 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

POLYNUCLEAR AROMATIC HYDROCARBONS
METHOD 625 HSL/TCL LIST - GC/MS

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenz(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	ND
2-Methylnaphthalene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS WATER	SOLID
Nitrobenzene-d5	77	(22-135)	(10-155)
Fluorobiphenyl	79	(34-140)	(12-153)
Terphenyl-d14	45	(10-132)	(13-140)

ENSECO-WADSWORTH/ALERT
Laboratories

.PANY : ABB ENVIRONMENTAL SERVICES, INC.
.B #: 3J2201-16
MATRIX : WATER

DATE RECEIVED: 10/21/93

SAMPLE ID : MW-16 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

METALS ANALYTICAL REPORT
SELECTED LIST

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	11/ 3/93	ND	5	ug/

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 10/21/9
LAB #: 3J2201-16
MATRIX : WATER

SAMPLE ID : MW-16 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

ANALYTICAL REPORT

PARAMETER	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Tot Recoverable Pet Hydrocarbons	11/ 2/93	ND	1	mg/L

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

PANY: ABB ENVIRONMENTAL SERVICES, INC.
B # 3J2201-17
MATRIX: WATER

DATE RECEIVED: 10/21/93
DATE EXTRACTED: NA
DATE ANALYZED: 11/ 2/93

SAMPLE ID: MW-17 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
METHOD 601/602 - GC

Benzene	16	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	6
2-Chloroethylvinyl ether	ND	Methylene chloride	21 B
C[illegible]oroform	ND	1,1,2,2-Tetrachloroethane	ND
[illegible]loromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	6
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	15
		Methyl-tert-butylether	3

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
[illegible]nochloromethane (HECD)	95	(78-122)
[illegible]ifluorotoluene (PID)	716	(73-131)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3J2201-17
MATRIX: WATER

DATE RECEIVED: 10/21/
DATE EXTRACTED: NA
DATE ANALYZED: 10/29/93

SAMPLE ID: MW-17 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
Bromoform (ECD)	(41-152)	(41-152)	291

ENSECO-WADSWORTH/ALERT
Laboratories

IPANY: ABB ENVIRONMENTAL SERVICES, INC.
AB #: 3J2201-17
MATRIX: WATER

DATE RECEIVED: 10/21/93
DATE EXTRACTED: 10/26/93
DATE ANALYZED: 10/30/93

SAMPLE ID: MW-17 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

POLYNUCLEAR AROMATIC HYDROCARBONS
METHOD 625 HSL/TCL LIST - GC/MS

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
.oenz(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	ND
2-Methylnaphthalene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS WATER	SOLID
.crobenzene-d5	85	(22-135)	(10-155)
.luorobiphenyl	81	(34-140)	(12-153)
Terphenyl-d14	41	(10-132)	(13-140)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 10/21/9
LAB #: 3J2201-17
MATRIX : WATER

SAMPLE ID : MW-17 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

METALS ANALYTICAL REPORT
SELECTED LIST

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	11/ 3/93	7	5	ug/

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

PANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 10/21/93
B #: 3J2201-17
MATRIX : WATER

SAMPLE ID : MW-17 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

ANALYTICAL REPORT

PARAMETER	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Tot Recoverable Pet Hydrocarbons	11/ 2/93	1	1	mg/L

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

PANY: ABB ENVIRONMENTAL SERVICES, INC.
3 # 3J2201-18
MATRIX: WATER

DATE RECEIVED: 10/21/93
DATE EXTRACTED: NA
DATE ANALYZED: 11/ 2/93

SAMPLE ID: MW-18 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	5
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	2
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
oromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	2
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	5
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
mochloromethane (HECD)	90	(78-122)
fluorotoluene (PID)	188	(73-131)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3J2201-18
MATRIX: WATER

DATE RECEIVED: 10/21/
DATE EXTRACTED: NA
DATE ANALYZED: 10/29/93

SAMPLE ID: MW-18 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
Bromoform (ECD)	(41-152)	(41-152)	1,448

ENSECO-WADSWORTH/ALERT
Laboratories

IPANY: ABB ENVIRONMENTAL SERVICES, INC.
.B #: 3J2201-18
MATRIX: WATER

DATE RECEIVED: 10/21/93
DATE EXTRACTED: 10/26/93
DATE ANALYZED: 10/30/93

SAMPLE ID: MW-18 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

POLYNUCLEAR AROMATIC HYDROCARBONS
METHOD 625 HSL/TCL LIST - GC/MS

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
.benz(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	ND
2-Methylnaphthalene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS WATER	SOLID
.trobenzene-d5	89	(22-135)	(10-155)
Fluorobiphenyl	87	(34-140)	(12-153)
Terphenyl-d14	48	(10-132)	(13-140)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 10/21/9
LAB #: 3J2201-18
MATRIX : WATER

SAMPLE ID : MW-18 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

METALS ANALYTICAL REPORT
SELECTED LIST

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	11/ 3/93	ND	5	ug/l

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

PANY : ABB ENVIRONMENTAL SERVICES, INC.
B #: 3J2201-18
MATRIX : WATER

DATE RECEIVED: 10/21/93

SAMPLE ID : MW-18 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

ANALYTICAL REPORT

PARAMETER	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Tot Recoverable Pet Hydrocarbons	11/ 2/93	ND	1	mg/l

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB # 3J2201-19
MATRIX: WATER

DATE RECEIVED: 10/21/9[illegible]
DATE EXTRACTED: NA
DATE ANALYZED: 11/ 2/93

SAMPLE ID: MW-19 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	16
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	89	(78-122)
Trifluorotoluene (PID)	104	(73-131)

ENSECO-WADSWORTH/ALERT
Laboratories

.PANY: ABB ENVIRONMENTAL SERVICES, INC.
.B #: 3J2201-19
MATRIX: WATER

DATE RECEIVED: 10/21/93
DATE EXTRACTED: NA
DATE ANALYZED: 10/30/93

SAMPLE ID: MW-19 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
Bromoform (ECD)	(41-152)	(41-152)	410

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3J2201-19
MATRIX: WATER

DATE RECEIVED: 10/21
DATE EXTRACTED: 10/26
DATE ANALYZED: 10/30/93

SAMPLE ID: MW-19 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

POLYNUCLEAR AROMATIC HYDROCARBONS
METHOD 625 HSL/TCL LIST - GC/MS

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenz(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	ND
2-Methylnaphthalene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS WATER	SOLID
Nitrobenzene-d5	77	(22-135)	(10-155)
Fluorobiphenyl	76	(34-140)	(12-153)
Terphenyl-d14	34	(10-132)	(13-140)

ENSECO-WADSWORTH/ALERT
Laboratories

PANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 10/21/93
B #: 3J2201-19
MATRIX : WATER

SAMPLE ID : MW-19 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

METALS ANALYTICAL REPORT
SELECTED LIST

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	11/ 3/93	ND	5	ug/

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 10/21/
LAB #: 3J2201-19
MATRIX : WATER

SAMPLE ID : MW-19 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

ANALYTICAL REPORT

PARAMETER	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Tot Recoverable Pet Hydrocarbons	11/ 2/93	1	1	mg/l

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

.PANY: ABB ENVIRONMENTAL SERVICES, INC.
.B # 3J2201-20
MATRIX: WATER

DATE RECEIVED: 10/21/93
DATE EXTRACTED: NA
DATE ANALYZED: 11/ 2/93

SAMPLE ID: MW-20 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
METHOD 601/602 - GC

Benzene	8	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	96
2-Chloroethylvinyl ether	ND	Methylene chloride	1 B
C'`oroform	ND	1,1,2,2-Tetrachloroethane	ND
.loromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	12
1,2-Dichlorobenzene	1	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	40
		Methyl-tert-butylether	12

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'
ND* (None Detected, lower detectable limit = ug/L) as rec'
-- (Not Analyzed)

S'`RROGATE RECOVERY:	%	ACCEPTABLE LIMITS
mochloromethane (HECD)	92	(78-122)
.ifluorotoluene (PID)	1,719	(73-131)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3J2201-20
MATRIX: WATER

DATE RECEIVED: 10/21/
DATE EXTRACTED: NA
DATE ANALYZED: 10/30/93

SAMPLE ID: MW-20 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
Bromoform (ECD)	(41-152)	(41-152)	670

ENSECO-WADSWORTH/ALERT
Laboratories

.PANY: ABB ENVIRONMENTAL SERVICES, INC.
B #: 3J2201-20
MATRIX: WATER

DATE RECEIVED: 10/21/93
DATE EXTRACTED: 10/26/93
DATE ANALYZED: 10/30/93

SAMPLE ID: MW-20 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

POLYNUCLEAR AROMATIC HYDROCARBONS
METHOD 625 HSL/TCL LIST - GC/MS

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Benz(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	ND
2-Methylnaphthalene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS WATER	SOLID
crobenzene-d5	78	(22-135)	(10-155)
.luorobiphenyl	77	(34-140)	(12-153)
Terphenyl-d14	50	(10-132)	(13-140)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 10/21/
LAB #: 3J2201-20
MATRIX : WATER

SAMPLE ID : MW-20 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059

METALS ANALYTICAL REPORT HRS84297
SELECTED LIST

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	11/ 3/93	14	8	ug/

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 10/21/93
LAB #: 3J2201-20
MATRIX : WATER

SAMPLE ID : MW-20 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

ANALYTICAL REPORT

PARAMETER	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Tot Recoverable Pet Hydrocarbons	11/ 2/93	2	1	mg/l

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB # 3J2201-21
MATRIX: WATER

DATE RECEIVED: 10/2
DATE EXTRACTED: N.
DATE ANALYZED: 11/ 2/93

SAMPLE ID: DUPLICATE 1 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
METHOD 601/602 - GC

Benzene	61	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	120
2-Chloroethylvinyl ether	ND	Methylene chloride	23 B
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	14
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	74
		Methyl-tert-butylether	8

NOTE: ND (None Detected, lower detectable limit = 5 ug/L) as rec'
ND* (None Detected, lower detectable limit = ug/L) as rec'
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	85	(78-122)
Trifluorotoluene (PID)	190	(73-131)

ENSECO-WADSWORTH/ALERT
Laboratories

?ANY: ABB ENVIRONMENTAL SERVICES, INC.
.B #: 3J2201-21
MATRIX: WATER

DATE RECEIVED: 10/21/93
DATE EXTRACTED: NA
DATE ANALYZED: 10/30/93

SAMPLE ID: DUPLICATE 1 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
Bromoform (ECD)	(41-152)	(41-152)	276

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3J2201-21
MATRIX: WATER

DATE RECEIVED: 10/2[illegible]
DATE EXTRACTED: 10/2[illegible] 3
DATE ANALYZED: 10/30/93

SAMPLE ID: DUPLICATE 1 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

POLYNUCLEAR AROMATIC HYDROCARBONS
METHOD 625 HSL/TCL LIST - GC/MS

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenz(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	ND
2-Methylnaphthalene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS WATER	SOLID
Nitrobenzene-d5	94	(22-135)	(10-155)
Fluorobiphenyl	92	(34-140)	(12-153)
Terphenyl-d14	80	(10-132)	(13-140)

ENSECO-WADSWORTH/ALERT
Laboratories

PANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 10/21/93
B #: 3J2201-21
MATRIX : WATER

SAMPLE ID : DUPLICATE 1 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

METALS ANALYTICAL REPORT
SELECTED LIST

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	11/ 3/93	7	5	ug/l

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 10/21/9
LAB #: 3J2201-21
MATRIX : WATER

SAMPLE ID : DUPLICATE 1 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

ANALYTICAL REPORT

PARAMETER	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Tot Recoverable Pet Hydrocarbons	11/ 2/93	2	1	mg/L

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

PANY: ABB ENVIRONMENTAL SERVICES, INC.
B # 3J2201-22
MATRIX: WATER

DATE RECEIVED: 10/21/93
DATE EXTRACTED: NA
DATE ANALYZED: 11/ 2/93

SAMPLE ID: DUPLICATE 2 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
METHOD 601/602 - GC

Benzene	1	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	2
2-Chloroethylvinyl ether	ND	Methylene chloride	2 B
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	3
1,2-Dichlorobenzene	1	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	2
		Methyl-tert-butylether	1

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	82	(78-122)
a,a,a-fluorotoluene (PID)	115	(73-131)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3J2201-22
MATRIX: WATER

DATE RECEIVED: 10/21
DATE EXTRACTED: NA
DATE ANALYZED: 10/30/93

SAMPLE ID: DUPLICATE 2 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
Bromoform (ECD)	(41-152)	(41-152)	532

ENSECO-WADSWORTH/ALERT
Laboratories

MPANY: ABB ENVIRONMENTAL SERVICES, INC.
AB #: 3J2201-22
MATRIX: WATER

DATE RECEIVED: 10/21/93
DATE EXTRACTED: 10/26/93
DATE ANALYZED: 10/30/93

SAMPLE ID: DUPLICATE 2 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

POLYNUCLEAR AROMATIC HYDROCARBONS
METHOD 625 HSL/TCL LIST - GC/MS

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenz(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	ND
2-Methylnaphthalene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS WATER	SOLID
Nitrobenzene-d5	80	(22-135)	(10-155)
Fluorobiphenyl	77	(34-140)	(12-153)
Terphenyl-d14	53	(10-132)	(13-140)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 10/21/
LAB #: 3J2201-22
MATRIX : WATER

SAMPLE ID : DUPLICATE 2 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

METALS ANALYTICAL REPORT
SELECTED LIST

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	11/ 3/93	ND	5	ug/

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB # 3J2201-BK
MATRIX: WATER

DATE RECEIVED: 10/21/93
DATE EXTRACTED: NA
DATE ANALYZED: 11/ 1/93

SAMPLE ID: LABORATORY BLANK

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	2
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	90	(78-122)
Trifluorotoluene (PID)	108	(73-131)

At that time all associated samples must be re-analyzed. A minimum of five percent (5%) of all laboratory analyses are laboratory analytical method check samples.

Matrix Spike (MS)/Matrix Spike Duplicate (MSD) Recovery Evaluations

Known concentrations of designated matrix spikes (actual analytical method compounds) are added to two of three separate aliquots of a sequentially predetermined sample prior to extraction and analysis. Percent recovery determinations are calculated from both of the spiked samples by comparison to the actual values generated from the unspiked sample. These percent recovery determinations indicate the accuracy of the analysis at recovering actual analytical method compounds from the matrix. Relative percent difference determinations calculated from a comparison of the MS/MSD recoveries demonstrate the precision of the analytical method. Actual percent recovery and relative percent difference data is displayed alongside their respective acceptable analytical method performance limits in the QA/QC section of the report. The MS/MSD are considered in control when the precision is within established control limits and the associated check sample has been found to be acceptable. A minimum of ten percent (10%) of all analyses are MS/MSD quality control samples.

**********EXAMPLE**********

COMPOUND	SAMPLE CONC.	MS %REC	MSD %REC	RPD	QC LIMITS RPD	QC LIMITS RECOVERY
4,4'-DDT	0	95	112	16	22	66-119
Benzene	10	86	93	8	20	39-150
(cmpd. name)	sample result	1st% recov.	2nd% recov.	Rel.% diff.	accep. method perform range	

Analytical Result Qualifiers

The following qualifiers, as defined below, may be appended to analytical results in order to allow proper interpretation of the results presented:

J - indicates an estimated concentration (typically used when a dilution, matrix interference or instrumental limitation prevents accurate quantitation of a particular analyte).

B - indicates the presence of a particular analyte in the laboratory blank analyzed concurrently with the samples. Results must be interpreted accordingly.

DIL - indicates that because of matrix interferences and/or high analyte concentrations, it was necessary to dilute the sample to a point where t surrogate or spike concentrations fell below a quantifiable amount and co not be reported.

ENSECO-WADSWORTH/ALERT
Laboratories

QUALITY ASSURANCE / QUALITY CONTROL PROGRAM SUMMARY

Wadsworth/ALERT Laboratories considers continuous analytical method performance evaluations to be an integral portion of the data package, and routinely includes the pertinent QA/QC data associated with various analytical result reports. Brief discussions of the various QA/QC procedures utilized to measure acceptable method and matrix performance follow.

Surrogate Spike Recovery Evaluations

Known concentrations of designated surrogate spikes, consisting of a number of similar, non-method compounds or method compound analogues, are added, as appropriate, to routine GC and GC/MS sample fractions prior to extraction and analysis. The percent recovery determinations calculated from the subsequent analysis is an indication of the overall method efficiency for the individual sample. This surrogate spike recovery data is displayed alongside acceptable analytical method performance limits at the bottom of each applicable analytical result report sheet.

NOTE: Acceptable method performance for Base/Neutral Acid extractables is indicated by two (2) of three (3) surrogates for each fraction with a minimum recovery of ten (10) percent each. For Pesticides one (1) of two (2) surrogates meeting performance criteria is acceptable.

Laboratory Analytical Method Blank Evaluations

Laboratory analytical method blanks are systematically prepared and analyzed in order to continuously evaluate the system interferences and background contamination levels associated with each analytical method. These method blanks include all aspects of actual laboratory method analysis (chemical reagents, glassware, etc.), substituting laboratory reagent water or solid for actual sample. The method blank must not contain any analytes above the reported detection limit. The following common laboratory contaminants are exceptions to this rule provided they are not present at greater than five times the detection limit.

Volatiles	Semi-volatiles	Metals
Methylene chloride	Dimethyl phthalate	Calcium
Toluene	Diethly phthalate	Magnesium
2-Butanone	Di-n-butyl phthalate	Sodium
Acetone	Butyl benzyl phthalate	
	Bis (2-ethylhexyl) phthalate	

A minimum of five percent (5%) of all laboratory analyses are laboratory analytical method blanks.

Laboratory Analytical Method Check Sample Evaluations

Known concentrations of designated matrix spikes (actual analytical method compounds) are added to a laboratory reagent blank prior to extraction and analysis. Percent recovery determinations demonstrate the performance of the analytical method. Failure of a check sample to meet established laboratory recovery criteria is cause to stop the analysis until the problem is resolved.

ENSECO-WADSWORTH/ALERT
Laboratories

QUALITY CONTROL SECTION

- Quality Control Summary
- Laboratory Blanks
- Laboratory Control Sample
- Matrix Spike/Matrix Spike Duplicate Results
- Sample Custody Documentation

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB # 3J2201-24
MATRIX: WATER

DATE RECEIVED: 10/21/93
DATE EXTRACTED: NA
DATE ANALYZED: 11/ 2/93

SAMPLE ID: TRIP BLANK BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	2 B
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	95	(78-122)
Trifluorotoluene (PID)	107	(73-131)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 10/21/
LAB #: 3J2201-23
MATRIX : WATER

SAMPLE ID : EQUIPMENT BLANK BOCA CHICA FLYING CLUB
CERTIFICATION #: E84059
HRS84297

ANALYTICAL REPORT

PARAMETER	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Tot Recoverable Pet Hydrocarbons	11/ 2/93	ND	1	mg/l

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 10/21/93
LAB #: 3J2201-23
MATRIX : WATER

SAMPLE ID : EQUIPMENT BLANK BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

METALS ANALYTICAL REPORT
SELECTED LIST

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	11/ 3/93	ND	5	ug

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3J2201-23
MATRIX: WATER

DATE RECEIVED: 10/27
DATE EXTRACTED: 10/28/93
DATE ANALYZED: 10/30/93

SAMPLE ID: EQUIPMENT BLANK BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

POLYNUCLEAR AROMATIC HYDROCARBONS
METHOD 625 HSL/TCL LIST - GC/MS

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenz(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	ND
2-Methylnaphthalene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS WATER	SOLID
Nitrobenzene-d5	88	(22-135)	(10-155)
Fluorobiphenyl	85	(34-140)	(12-153)
Terphenyl-d14	65	(10-132)	(13-140)

ENSECO-WADSWORTH/ALERT
Laboratories

PANY: ABB ENVIRONMENTAL SERVICES, INC.
B #: 3J2201-23
MATRIX: WATER

DATE RECEIVED: 10/21/93
DATE EXTRACTED: NA
DATE ANALYZED: 10/30/93

SAMPLE ID: EQUIPMENT BLANK BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
_romoform (ECD)	(41-152)	(41-152)	115

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB # 3J2201-23
MATRIX: WATER

DATE RECEIVED: 10/21
DATE EXTRACTED: NA
DATE ANALYZED: 11/ 7/93

SAMPLE ID: EQUIPMENT BLANK

BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	98	(78-122)
Trifluorotoluene (PID)	112	(73-131)

ENSECO-WADSWORTH/ALERT
Laboratories

.PANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 10/21/93
.B #: 3J2201-22
MATRIX : WATER

SAMPLE ID : DUPLICATE 2 BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

ANALYTICAL REPORT

PARAMETER	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Tot Recoverable Pet Hydrocarbons	11/ 2/93	ND	1	mg/l

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB # 3J2201-23
MATRIX: WATER

DATE RECEIVED: 10/21
DATE EXTRACTED: NA
DATE ANALYZED: 11/ 2/93

SAMPLE ID: EQUIPMENT BLANK

BOCA CHICA FLYING CLUB

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	14 B
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'
ND* (None Detected, lower detectable limit = ug/L) as rec'
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	94	(78-122)
Trifluorotoluene (PID)	110	(73-131)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB # 3J2201-BK
MATRIX: WATER

DATE RECEIVED: 10/21/93
DATE EXTRACTED: NA
DATE ANALYZED: 11/ 2/93

SAMPLE ID: LABORATORY BLANK

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	78	(78-122)
Trifluorotoluene (PID)	112	(73-131)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3J2201-BK
MATRIX: WATER

DATE RECEIVED: 10/2[illegible]
DATE EXTRACTED: NA
DATE ANALYZED: 10/28/93

SAMPLE ID: LABORATORY BLANK

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
Bromoform (ECD)	(41-152)	(41-152)	93

ENSECO-WADSWORTH/ALERT
Laboratories

PANY: ABB ENVIRONMENTAL SERVICES, INC.
JB #: 3J2201-BK
MATRIX: WATER

DATE RECEIVED: 10/21/93
DATE EXTRACTED: NA
DATE ANALYZED: 10/29/93

SAMPLE ID: LABORATORY BLANK

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
Bromoform (ECD)	(41-152)	(41-152)	104

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3J2201-BK
MATRIX: WATER

DATE RECEIVED: 10/21/
DATE EXTRACTED: NA
DATE ANALYZED: 10/30/93

SAMPLE ID: LABORATORY BLANK

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
Bromoform (ECD)	(41-152)	(41-152)	96

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3J2201-BK
MATRIX: WATER

DATE RECEIVED: 10/21/93
DATE EXTRACTED: 10/26/93
DATE ANALYZED: 10/29/93

SAMPLE ID: LABORATORY BLANK

CERTIFICATION #: E84059
HRS84297

POLYNUCLEAR AROMATIC HYDROCARBONS
METHOD 625 HSL/TCL LIST - GC/MS

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Benz(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	ND
2-Methylnaphthalene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS WATER	SOLID
Nitrobenzene-d5	80	(22-135)	(10-155)
2-Fluorobiphenyl	82	(34-140)	(12-153)
p-Terphenyl-d14	88	(10-132)	(13-140)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 10/21/
LAB #: 3J2201-BK
MATRIX : WATER

SAMPLE ID : LABORATORY BLANK

CERTIFICATION #: E84059
HRS84297

METALS ANALYTICAL REPORT
SELECTED LIST

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	11/ 3/93	ND	5	ug/

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

PANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 10/21/93
B #: 3J2201-BK
ATRIX : WATER

SAMPLE ID : LABORATORY BLANK

CERTIFICATION #: E84059
HRS84297

METALS ANALYTICAL REPORT
SELECTED LIST

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	11/ 3/93	ND	5	ug/

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 10/21/
LAB #: 3J2201-BK
MATRIX : WATER

SAMPLE ID : LABORATORY BLANK

CERTIFICATION #: E84059
HRS84297

ANALYTICAL REPORT

PARAMETER	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Tot Recoverable Pet Hydrocarbons	11/ 1/93	ND	1	mg/L

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

PANY : ABB ENVIRONMENTAL SERVICES, INC.
B #: 3J2201-BK
MATRIX : WATER

DATE RECEIVED: 10/21/93

SAMPLE ID : LABORATORY BLANK

CERTIFICATION #: E84059
HRS84297

ANALYTICAL REPORT

PARAMETER	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Tot Recoverable Pet Hydrocarbons	11/ 2/93	ND	1	mg/L

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

LAB ID : LCS
MATRIX : WATER
METHOD : 601/2
RUN ID : MA/MB02080

DATE EXTRACTED: N/A
ATE ANALYZED : 11/06/93

LABORATORY CONTROL SAMPLE RESULTS

COMPOUND	ANALYTICAL RUN ID #	LCS %REC	QC LIMITS RPD	QC LIMITS %REC
Benzene	MA/MB02080	112	21	80-123
Toluene		115	19	80-119
Chlorobenzene		110	23	71-118
1,1-Dichloroethene		89	42	61-144
Trichloroethene		101	30	69-129
Dichlorobromomethane		98	40	54-134

ENSECO-WADSWORTH/ALERT
Laboratories

LAB ID : LCS
MATRIX : WATER
METHOD : 601/2
RUN ID : MA/MB02506

DATE EXTRACTED: N/A
DATE ANALYZED : 11/01/93

LABORATORY CONTROL SAMPLE RESULTS

COMPOUND	ANALYTICAL RUN ID #	LCS %REC	QC LIMITS RPD	QC LIMITS %REC
Benzene	MA/MB02506	105	21	80-123
Toluene		105	19	80-119
Chlorobenzene		101	23	71-118
1,1-Dichloroethene		108	42	61-144
Trichloroethene		108	30	69-129
Dichlorobromomethane		102	40	54-134

ENSECO-WADSWORTH/ALERT
Laboratories

LAB ID : LCS
MATRIX : WATER
METHOD : 601/2
RUN ID : MA/MB02530

DATE EXTRACTED: N/A
DATE ANALYZED : 11/02/93

LABORATORY CONTROL SAMPLE RESULTS

COMPOUND	ANALYTICAL RUN ID #	LCS %REC	QC LIMITS RPD	QC LIMITS %REC
Benzene	MA/MB02530	110	21	80-123
Toluene		109	19	80-119
Chlorobenzene		104	23	71-118
Trichloroethene		121	30	69-129
Dichlorobromomethane		118	40	54-134

ENSECO-WADSWORTH/ALERT
Laboratories

LAB ID : LCS
MATRIX : WATER
METHOD : 601/2
RUN ID : MA/MB02080

DATE EXTRACTED: N/A
DATE ANALYZED : 11/06/93

LABORATORY CONTROL SAMPLE RESULTS

COMPOUND	ANALYTICAL RUN ID #	LCS %REC	QC LIMITS RPD	QC LIMITS %REC
Benzene	MA/MB02080	112	21	80-123
Toluene		115	19	80-119
Chlorobenzene		110	23	71-118
1,1-Dichloroethene		89	42	61-144
Trichloroethene		101	30	69-129
Dichlorobromomethane		98	40	54-134

ENSECO-WADSWORTH/ALERT
Laboratories

LAB ID : LCS
MATRIX : WATER
METHOD : 601 Mod.
RUN ID : EDB2405

DATE EXTRACTED: N/A
DATE ANALYZED : 10/28/93

LABORATORY CONTROL SAMPLE RESULTS

COMPOUND	ANALYTICAL RUN ID #	LCS %REC	QC LIMITS RPD	QC LIMITS %REC
Ethylene Dibromide	EDB2405	105	33	62-129

ENSECO-WADSWORTH/ALERT
Laboratories

LAB ID : LCS
MATRIX : WATER
METHOD : 601 Mod.
RUN ID : EDB2429

DATE EXTRACTED: N/A
DATE ANALYZED : 10/29/93

LABORATORY CONTROL SAMPLE RESULTS

COMPOUND	ANALYTICAL RUN ID #	LCS %REC	QC LIMITS RPD	QC LIMITS %REC
Ethylene Dibromide	EDB2429	113	33	62-129

ENSECO-WADSWORTH/ALERT
Laboratories

LAB ID : LCS
MATRIX : WATER
METHOD : 601 Mod.
RUN ID : EDB2453

DATE EXTRACTED: N/A
DATE ANALYZED : 10/30/93

LABORATORY CONTROL SAMPLE RESULTS

COMPOUND	ANALYTICAL RUN ID #	LCS %REC	QC LIMITS RPD	QC LIMITS %REC
Ethylene Dibromide	EDB2453	124	33	62-129

ENSECO-WADSWORTH/ALERT
Laboratories

LAB ID : LCS
MATRIX : WATER
METHOD : 625
RUN ID : J0659

DATE EXTRACTED: 10/26/93
DATE ANALYZED : 10/29/93

LABORATORY CONTROL SAMPLE RESULTS

COMPOUND	ANALYTICAL RUN ID #	LCS %REC	QC LIMITS RPD	QC LIMITS %REC
1-Methylnaphthalene	J0659	88	26	41-119
Fluorene		83	27	36-120
Chrysene		91	30	29-120
Pyrene		94	32	32-130
Acenaphthene		89	36	35-146
Naphthalene		91	36	32-140

ENSECO-WADSWORTH/ALERT
Laboratories

LAB ID : LCS
MATRIX : WATER
METHOD : 625
RUN ID : KMSA-093.D

DATE EXTRACTED: 10/26/93
DATE ANALYZED : 11/10/93

LABORATORY CONTROL SAMPLE RESULTS

COMPOUND	ANALYTICAL RUN ID #	LCS %REC	QC LIMITS RPD	QC LIMITS %REC
Naphthalene	KMSA-093.D	88	36	32-140
1-Methylnaphthalene		91	26	41-119
Acenaphthene		83	36	35-146
Fluorene		86	27	36-120
Pyrene		78	32	32-130
Chrysene		85	30	29-120

ENSECO-WADSWORTH/ALERT
Laboratories

LAB ID : LCS MATRIX : WATER

LABORATORY CONTROL SAMPLE RESULTS
METALS

ELEMENT	DATE PREPARED	DATE ANALYZED	LCS %REC	QC LIMITS RPD	QC LIMITS %REC	
Lead (furnace)	11/03/93	11/03/93	95	28	70-126	LC

ENSECO-WADSWORTH/ALERT
Laboratories

LAB ID : LCS MATRIX : WATER

LABORATORY CONTROL SAMPLE RESULTS
WET CHEMISTRY

PARAMETER	DATE PREPARED	DATE ANALYZED	LCS %REC	QC LIMITS RPD	QC LIMITS %REC	
TRPH (IR)	11/01/93	11/01/93	89	24	75-123	LC
TRPH (IR)	11/02/93	11/02/03	86	24	75-123	

ENSECO-WADSWORTH/ALERT
Laboratories

LAB ID : LCS MATRIX : WATER

LABORATORY CONTROL SAMPLE RESULTS
WET CHEMISTRY

PARAMETER	DATE PREPARED	DATE ANALYZED	LCS %REC	QC LIMITS RPD	QC LIMITS %REC	
Total Dissolved Solids	10/25/93	10/26/93	99	15	80-112	LC

ENSECO-WADSWORTH/ALERT
Laboratories

LAB ID : 302201-1
MATRIX : WATER
METHOD : 601/2
RUN ID : MA/MB02536/7

DATE RECEIVED : 10/21/93
DATE PREPARED : N/A
DATE ANALYZED : 11/03/93

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

COMPOUND	ANALYTICAL RUN ID #	MS %REC	MSD %REC	RPD	QC LIMITS RPD	QC LIMITS %REC
Benzene	MA/MB02536/7	111	102	8	15	70-117
Toluene		109	101	8	16	70-117
Chlorobenzene		110	98	12	24	58-133
1,1-Dichloroethene		117	102	14	28	43-131
Trichloroethene		118	105	12	47	49-143
Dichlorobromomethane		112	95	16	22	61-13[illegible]

* = Diluted Out

ENSECO-WADSWORTH/ALERT
Laboratories

LAB ID : 3J2201-3
MATRIX : WATER
METHOD : 601 Mod.
RUN ID : EDB2494B

DATE RECEIVED : 10/21/93
DATE PREPARED : N/A
DATE ANALYZED : 11/05/93

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

COMPOUND	ANALYTICAL RUN ID #	MS %REC	MSD %REC	RPD	QC LIMITS RPD	QC LIMITS %REC
Ethylene Dibromide	EDB2494B	129	139	7	25	81-135

* = Diluted Out

ENSECO-WADSWORTH/ALERT
Laboratories

LAB ID : 3J2201-20
MATRIX : WATER
METHOD : 601/2
RUN ID : MA/MB02538/9

DATE RECEIVED : 10/21/93
DATE PREPARED : N/A
DATE ANALYZED : 11/03/93

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

COMPOUND	ANALYTICAL RUN ID #	MS %REC	MSD %REC	RPD	QC LIMITS RPD	QC LIMITS %REC
Benzene	MA/MB02538/9	101	100	1	15	70-117
Toluene		63	65	3	16	70-117
Chlorobenzene		98	100	2	24	58-133
1,1-Dichloroethene		101	102	1	28	43-131
Trichloroethene		102	102	0	47	49-143
Dichlorobromomethane		97	99	2	22	61-1

* = Diluted Out

ENSECO-WADSWORTH/ALERT
Laboratories

LAB ID : 3J2201-20
MATRIX : WATER
METHOD : 625
RUN ID : KMSA094.D/KMSA095.D

DATE RECEIVED : 10/21/93
DATE PREPARED : 10/26/93
DATE ANALYZED : 11/10/93

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

COMPOUND	ANALYTICAL RUN ID #	MS %REC	MSD %REC	RPD	QC LIMITS RPD	QC LIMITS %REC
Naphthalene	KMSA094.D/KMSA095.	80	113	34	23	25-97
1-Methylnaphthalene		82	114	33	24	48-101
Acenaphthene		78	104	29	24	57-104
Fluorene		76	102	29	28	34-118
[illegible]rene		63	109	53	30	58-148
[illegible]ysene		72	102	34	36	48-118

* = Diluted Out

ENSECO-WADSWORTH/ALERT
Laboratories

LAB ID : 3J2201-1
MATRIX : WATER
METHOD : 601 Mod.
RUN ID : EDB2293A

DATE RECEIVED : 10/21/93
DATE PREPARED : N/A
DATE ANALYZED : 11/05/93

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

COMPOUND	ANALYTICAL RUN ID #	MS %REC	MSD %REC	RPD	QC LIMITS RPD	QC LIMITS %REC
Ethylene Dibromide	EDB2293A	145	157	8	25	81-135

* = Diluted Out

ENSECO-WADSWORTH/ALERT
Laboratories

LAB ID : 3J2201-20
MATRIX : WATER
METHOD : 625
RUN ID : J0698/J0699

DATE RECEIVED : 10/21/93
DATE PREPARED : 10/26/93
DATE ANALYZED : 10/31/93

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

COMPOUND	ANALYTICAL RUN ID #	MS %REC	MSD %REC	RPD	QC LIMITS RPD	QC LIMITS %REC
Naphthalene	J0698/J0699	118	86	31	23	25-97
1-Methylnaphthalene		84	81	4	24	48-101
Acenaphthene		87	90	3	24	57-104
Fluorene		82	84	2	28	34-118
[illegible]ene		98	97	1	30	58-148
[illegible]ysene		84	85	1	36	48-118

* = Diluted Out

ENSECO-WADSWORTH/ALERT
Laboratories

LAB ID : 3J2201-16 DATE RECEIVED : 10/21/93
MATRIX : WATER

MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY
INORGANIC PARAMETERS - METALS

ELEMENT	DATE PREPARED	DATE ANALYZED	MS %REC	MSD %REC	RPD	QC LIMITS RPD	QC LIMITS %REC	LAB ID
Lead (furnace)	11/03/93	11/03/93	86	93	8	24	76-124	3J2201-

* = Diluted out

ENSECO-WADSWORTH/ALERT LABORATORIES
SAMPLE SHIPPER EVALUATION AND RECEIPT FORM

Client: ABB Project Name/Number: Boca Chica Flyng C

Samples Received By: [signature] /EWAL Date Received: 10-21-93
(Signature)

Sample Evaluation Form By: [signature] /EWAL LAB No: 32201/8006
(Signature)

Type of shipping container samples received in? WAL Cooler ✓

Client Cooler ____ WAL Shipper ____ Box ____ Other ____

Any "NO" responses or discrepancies should be explained in comments section.

		YES	NO
1.	Were custody seals on shipping container(s) intact?	No Seals	
2.	Were custody papers properly included with samples?	✓	
3.	Were custody papers properly filled out (ink, signed, match labels)?	✓	
4.	Did all bottles arrive in good condition (unbroken)?	✓	
5.	Were all bottle labels complete (Sample No., date, signed, analysis preservatives)?	✓	
6.	Were correct bottles used for the tests indicated?	✓	
7.	Were proper sample preservation techniques indicated?	✓	
8.	Were samples received within adequate holding time?	✓	
9.	Were all VOA bottles checked for the presence of air bubbles? (If air bubbles were found indicate in comment section)	✓	
10.	Were samples in direct contact with wet ice? (NOTE TEMPERATURE BELOW)	✓	
11.	Were samples accepted into the laboratory? (If no see comments)	✓	

Cooler # — Temp 4 °C Cooler # — Temp 3 °C

Cooler # — Temp 4 °C Cooler # — Temp 4 °C

Comments: ____

WADSWORTH/ALERT LABORATORIES
Sampling, testing, mobile labs

5910 Breckenridge Pkwy
Suite H
Tampa, FL 33610

(813) 621-0784
Fax (813) 623-6021

Chain of Custody Record

Record 1 of 3

09083

nt:	Project Name / Location	
ABB-ES	BOCA CHICA FLYING CLUB	
ple(s) Roger Durham Jay Koch	Project #:	

	Date	Time	MATRIX	Sample Location	No. Of CONTAINERS	Parameter: VOC- 601/602	PAH-	METALS- Pb	TRPH-	EDB-	TDS					Remarks
1	10/19/93	0840	H2O	EQUIPMENT BLANK	8	2	2	1	1	2						
2		0935		MW 6	8	2	2	1	1	2						
3		—		DUPLICATE 1	8	2	2	1	1	2						
4		0955		MW 10	9	2	2	1	1	2	1					
5		1005		MW 13	8	2	2	1	1	2						
6		—		DUPLICATE 2	8	2	2	1	1	2						
7		1020		MW 4	8	2	2	1	1	2						
8		1105		MW 1	8	2	2	1	1	2						
9		1129		MW 20	8	2	2	1	1	2						
10		1140		MW 3	8	2	2	1	1	2						
11		1200		MW 12	8	2	2	1	1	2						

Total Containers: 89

Number of Coolers in Shipment: 5

Bailers:

Report To: Roger Durham

Additional Comments:

TRPH & 601/602 preserved w/ HCl

Pb preserved w/ HNO3

Transfer Number	Item Number(s)	Relinquished By / Company	Accepted By / Company	Date	Time
1		Rydurham / ABB	[illegible] / EWAL	10/21/93	1500
2					
3					
4					
5					
6					

Original Accompan[illegible] hipment

WADSWORTH/ALERT LABORATORIES
Sampling, testing, mobile labs

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Chain of Custody Record

Record ____ of ____

09085

Client: ABB-ES

Project Name / Location: BOCA CHICA FLYING CLUB

Sampler(s): Jay Koch

Project #:

Item #	Date	Time	MATRIX	Sample Location	No. Of CONTAINERS	Parameter: VOC-601/602	PAH-	METALS- Pb	TRPH-	EDB-	TDS	Remarks
14 1	10/19/93	1210	H2O	MW 14D	9	2	2	1	1	2	1	
5 2		1215		MW5	8	2	2	1	1	2		
23		1420		MW 2	8	2	2	1	1	2		
16 4		1445		MW 16	8	2	2	1	1	2		
8 5		1500		MW 8	8	2	2	1	1	2		
17 6		1530		MW17	8	2	2	1	1	2		
9 7		1550		MW9	8	2	2	1	1	2		
18 8		1600		MW18	8	2	2	1	1	2		
15 9		1605		MW15D	8	2	2	1	1	2		
19 10		1630		MW19	8	2	2	1	1	2		
11 11		1700		MW11	8	2	2	1	1	2		

Total Containers: 89

Number of Coolers in Shipment: 5

Bailers:

Report To: Rogare Durham

Additional Comments:
TRPH & 601/602 preserved w/ HCl
Pb preserved w/ HNO3

Transfer Number	Item Number(s)	Relinquished By / Company	Accepted By / Company	Date	Time
1		[signature]	[signature] /ENAL	10/21/93	1500
2					
3					
4					
5					
6					

Original Accompa Shipment

Chain of Custody Record

ADSWORTH/ALERT LABORATORIES
Sampling, testing, mobile labs

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Suite H
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(813) 621-0784
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Record ____ of ____

09087

Client: ABB-ES

Project Name / Location: BOCA CHICA FLYNG CLUB

Sampler(s): Jay Koch

Project #:

Item #	Date	Time	MATRIX	Sample Location	No. Of CON-TAINERS	Parameter: VOC - 601/602	PAH -	METALS - Pb	TRPH -	EDB -	TDS	Remarks
1	10/14/93	1720	H2O	MW7	8	2	2	1	1	2		
2	10/15/93	1559	H2O	TRIP BLANK	3	3						
3												
4												
5												
6												
7												
8												
9												
10												
11												

Total Containers: 11

Number of Coolers in Shipment: 5

Bailers:

Report To: Roger DURHAM

Additional Comments:
TRPH & 601/602 preserved w/ HCl
Pb preserved w/ HNO3

Transfer Number	Item Number(s)	Relinquished By / Company	Accepted By / Company	Date	Time
1		[illegible] / ABB	[illegible] / EWAL	10-21-93	15:00
2					
3					
4					
5					
6					

Original Accompa[illegible] Shipment